I-280 Transfer Concept Program

Environmental Impact Report

Draft

Publication Date: September 28, 1984
Public Hearing Date: November 15, 1984
Public Comment Period: October 15 to November 30, 1984

California Department of Transportation
City and County of San Francisco
Metropolitan Transportation Commission

City and County of San Francisco
Department of City Planning
Case Number: 84.385 ENLA

State of California Clearinghouse
Number: 83012509

DRAFT

ENVIRONMENTAL IMPACT REPORT

FOR THE

I-280 TRANSFER CONCEPT PROGRAM

IN

SAN FRANCISCO, CALIFORNIA

PREPARED UNDER THE DIRECTION OF

A POLICY CONTROL COMMITTEE CONSISTING OF

CALIFORNIA DEPARTMENT OF TRANSPORTATION
CITY AND COUNTY OF SAN FRANCISCO
And
METROPOLITAN TRANSPORTATION COMMISSION

Funded in part by

Urban Mass Transportation Administration
Federal Highway Administration

A public hearing on the Draft EIR will be held on November 15, 1984. The time and place of the hearing will be advertised in local newspapers.

Pursuant to California Environmental Quality Act guidelines, Caltrans has been designated Lead Agency for the preparation of this Draft EIR. For further information, please contact:

Mr. William Chastain
Caltrans
P.O. Box 7310
San Francisco, CA 94120
(415) 557-8969

Comments on this Draft EIR must be submitted by November 30, 1984. Comments can be sent to Caltrans at the above address.

N O T I C E

Senate Concurrent Resolution 74, enacted by the State Legislature June 5, 1984, requests the Metropolitan Transportation Commission, in cooperation with the Department of Transportation, transit operators and local governments in the San Jose - San Francisco Corridor, to develop a mass transit system plan and incremental improvement plan for the Corridor. These plans are to be completed and submitted to the Legislature no later than March 1, 1985. A complete copy of SCR 74 is attached as Appendix H.

Only a portion of the transit alternatives required to be considered in the SCR 74 report have been included in this Draft Environmental Impact Report, and no decision will be made with respect to any transit elements that involve the San Jose - San Francisco Transit Corridor pending completion of the SCR 74 study.

Circulation of this Draft Environmental Impact Report and the public hearing to be held November 15, 1984 are being undertaken at this time to expedite implementation of other I-280 Transfer Concept Program elements. This course of action was approved on August 1, 1984 by the I-280 Transfer Concept Program Policy Control Committee representing the Metropolitan Transportation Commission, the City of San Francisco and Caltrans.

I-280 TRANSFER CONCEPT PROGRAM

September 28, 1984

TO: Distribution List for the I-280 Transfer Concept Program EIR

FROM: William Chastain, Caltrans

SUBJECT: Final Environmental Impact Report for the I-280 Transfer Concept Program

This is the draft of the Environmental Impact Report (EIR) for the I-280 Transfer Concept Program. A public hearing will be held on this document on November 15, 1984. After the public hearing, a document titled "Summary of Comments and Responses," will be prepared which will contain a summary of all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR.

This Draft EIR, together with the Summary of Comments and Responses document, will be considered by the City and County of San Francisco, and certified as a Final EIR for City purposes if deemed adequate. The State, as Lead Agency, will subsequently process a Final EIR, which may include additional information, in accordance with Caltrans procedures established under the California Environmental Quality Act. This document will form a basis for subsequent federal processing.

For those who wish to receive a copy of the City or Caltrans FEIR, information is provided on the following sheet.

Thank you for your interest in this project.

REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT

To: Caltrans

Re: I-280 Transfer Concept Program Final EIR

We are aware that many people who receive the Draft EIR and Summary of Comments and Responses have no interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR to private individuals only if they request them.

If you want a copy of the Final EIR, please so indicate in the space provided below and mail the request to Caltrans. Any private party not requesting a Final EIR will not be mailed a copy. Public agencies on the distribution list will automatically receive a copy of the Final EIR.

(____) A copy of the Final EIR as approved by the City and County of San Francisco.

(____) A copy of the Final EIR processed by Caltrans in conformity with the California Environmental Quality Act.

(Signed): ______________________________

Print Your Name and Address Below:

____
(Last/First Name)

____
(House Number and Street)

____
(City, State and Zip Code)

This page is a self-mailer. Tear out the page; fold on the dotted lines, with the Caltrans address on the outside; seal; add postage; and mail.

(fold here)

Return address:

____

____

____

Place
postage
here

Caltrans
P.O. Box 7310
San Francisco, California 94120

ATTN: Mr. William Chastain

(fold here)

TABLE OF CONTENTS

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

LIST OF TABLES

Table of Contents (continued)

LIST OF TABLES

Table of Contents (continued)

LIST OF TABLES

LIST OF FIGURES

Table of Contents (continued)

LIST OF FIGURES

Table of Contents (continued)

LIST OF FIGURES

I. SUMMARY

INTRODUCTION

The I-280 Transfer Concept Program Draft Environmental Impact Report (DEIR) has been developed consistent with applicable state and local regulations, as well as potentially applicable federal guidelines. Its purpose is to provide interested citizens, elected officials, and government agencies with the information necessary to choose transportation improvements for the northeastern waterfront area of San Francisco. The project area is a significant transportation corridor, providing access to the Downtown, Waterfront, Fisherman's Wharf, Fort Mason, Chinatown, North Beach, Telegraph Hill, and South of Market areas of San Francisco (see Figure II-1, Chapter II). A number of highways and public transit facilities also provide access between the project area and the greater Bay Area.

Interstate Route 280 (I-280) was originally planned to link with the Embarcadero Freeway (SR-480) waterfront route and the Bay Bridge. The planned 1.4-mile connection to the Embarcadero Freeway was not built because of opposition to a waterfront freeway. In 1973 an amendment to the Federal Highway Act, Title 23, authorized withdrawal of any unconstructed segments of the Interstate System and substitution of these segments with other highway or transit projects. This amendment is the basis for developing the I-280 Transfer Concept Program (TCP).

The DEIR is part of the larger I-280 TCP study being prepared to assist decision-makers in selecting transportation improvements for the project area. The I-280 TCP study started with defining the study goals and objectives and developing a set of alternatives to be assessed in the study. This was followed by detailed analysis of the alternatives concerning transportation, urban design, economic, social, and environmental impacts. Results of these studies were presented in various reports and working papers. (A complete list of these documents appears in Appendix C.) The study's Technical Advisory Committee (TAC) then commented on the working papers and their comments are

reflected in supplements to the working papers. The information derived from the detailed studies and TAC's comments on the study working papers provided the basis for this DEIR.

This Draft EIR is being circulated for public review and comments. Toward the conclusion of the public review and comment period a joint State and City public hearing will be held on the Draft EIR. Comments on the draft received from agencies and members of the public during the review period and during the public hearing will be responded to in writing. A Final Environmental Impact Report (the DEIR plus the written responses to comments on the draft) will then be certified by the City as a source document for local decision-making on transportation improvements for the I-280 TCP project area. The State will then process the Final EIR in accordance with Caltrans procedures established under the California Environmental Quality Act.

In addition to being a DEIR for State and City purposes, this report was originally intended to also be an Alternative Analysis/Draft Environmental Impact Statement (AA/DEIS) in the federal environmental review process. Therefore, the original version of this report was prepared in the form of a combined AA/DEIS/DEIR, and followed the applicable guidelines of both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), as well as the guidelines set forth by the Urban Mass Transportation Administration (UMTA) for Alternatives Analysis of major transportation projects.

In April, 1984, following federal review of the original version of this report, UMTA expressed the opinion that while the document would be useful for local decision-making on transportation improvements in the I-280 TCP project area and the use of the Interstate substitution funds, it lacked some of the project level specificity on individual TCP projects to meet the requirements of a project level DEIS.

On August 1, 1984, as a result of UMTA suggestions, the study's Policy Control Committee (PCC) elected to change the original AA/DEIS/DEIR into a DEIR. Most of the technical information and discussions related to the fiscal aspects of the TCP alternatives and to Parklands (Section 4 (f) discussions) have been retained. Although not required in an EIR, this information could serve as the basis for the preparation of subsequent Federal environmental documents on selected projects.

The organization of this summary parallels the outline of the Draft EIR. Areas discussed include: Project Definition and Purpose and Need for Action; Alternatives; Environmental Impacts and Mitigation; Historic and Archaeological Resources and Parklands; Evaluation of Alternatives; and Community Involvement/Citizen Participation. An additional section of this summary discusses outstanding issues and refinements. The date for the receipt of comments on this report is indicated in the concluding section of this chapter. Chapter IV of this report presents information on environmental setting as a basis for evaluating the impacts of the alternatives. The environmental setting information is not summarized in this chapter. Chapter VII of this report is in itself a summary of major issues, impacts, and mitigation measures. Therefore, it is not necessary to duplicate it in this chapter.

A. PROJECT DEFINITION AND PURPOSE AND NEED FOR ACTION

1. Background

The project area, referred to as the Embarcadero Corridor, is located along the waterfront of the northeastern part of San Francisco (see Figure II-1, Chapter II). Historically, land uses in this area have consisted of densely developed business and residential districts north of Market Street, and lower density industrial and maritime-related districts south of Market Street and immediately adjacent to the waterfront. During the past century, San Francisco has been the major employment and market center for the Bay Area. A major contribution to this was the development of transit and highway facilities that focussed on San Francisco. While employment has continued to increase in San Francisco, in recent decades industrial and shipping activities have shifted away from the City. Shifts in land use patterns have resulted, especially within the waterfront and South-of-Market Street areas. The trend has been primarily from shipping, warehousing, and manufacturing uses to more dense commercial, office, and residential uses. These land use shifts create a demand for additional and different means of access and circulation for the many new workers and residents in this area.

Much of the extensive transportation system that serves downtown San Francisco and the project corridor is operating at or above capacity during commute periods. Although outlying areas of the region are expected to capture an increasing percentage of new office development, San Francisco is expected to remain the dominant office center of the Bay Area. Much of this new development is expected to occur in the Embarcadero Corridor, especially south of Market Street. Consequently, the traffic and transit deficiencies currently observed in the corridor will worsen, particularly during weekday commute periods.

2. Program Elements

The I-280 Transfer Concept Program is made up of several elements which are listed below and discussed in more detail in Section B. Program elements include: additional ramps linking I-280 with the San Francisco street system, modifications to the Embarcadero Freeway, reconstruction of the Embarcadero surface roadway, Muni Metro extension to the Southern Pacific (SP) Depot, extension of Peninsula Commute Service to downtown San Francisco, development of a Muni E-Line streetcar along the waterfront, additional street and ramp modifications, provisions of intercept parking facilities, Transportation Systems Management (TSM) improvements, Transbay Terminal improvements, capital improvements to the Peninsula Commute Service, and provision of rail transit access to San Francisco International Airport. The last three elements have been studied previously and are not part of this project, but they are eligible for funding through the Transfer Concept Program.

3. Purpose and Need

A primary purpose of the I-280 TCP will be to provide significant transportation improvements for the San Francisco Bay Area, while enhancing the character of the northeastern waterfront area of the City. Satisfactory levels of mobility will be sought for the near future as well as through the year 2000 and beyond. The TCP should provide the mix of transportation projects that best meets the needs of existing and future residents, commuters, and other users of the transportation facilities in the project corridor. One important criterion in selecting the TCP projects will be the extent to which they achieve the goals and objectives adopted by the Policy Control Committee. These goals and objectives are listed in Appendix A of this report.

Each of the eight elements of the TCP assessed in this DEIR was derived from transportation studies and plans completed in recent years. The elements are all interrelated in purpose, need, and function. Statements of purpose and need for each element are discussed in detail in Chapter II of this report.

B. ALTERNATIVES

Early in the I-280 Transfer Concept Program study, eight alternatives were developed for detailed study. These alternatives were derived from a "long list" of alternatives, which was compiled based on results of previous studies, suggestions from TAC members, and

other sources. After the "long list" alternatives were reviewed and public input received, the study team and TAC selected six alternatives for analysis. Two additional alternatives (IVA and VA) were added to the study during the technical analysis phase of the study.

Each alternative consists of a combination of treatments for eight design elements. These elements include: design of the touchdown for I-280; treatment of the Embarcadero Freeway; reconstruction of the Embarcadero roadway; extension of Muni Metro and/or the Peninsula Commute Service line between the existing SP depot and downtown San Francisco; construction of a Muni E-Line streetcar along the northeastern waterfront; additional street and ramp modifications; intercept parking facilities; and TSM improvements along the northeastern waterfront. The chart in Appendix G lists the proposed treatments of the various elements for the eight alternatives. (This chart is on a fold-out sheet that the reader can keep open and refer to while reading this report.)

Alternative I (the No Project Alternative) maintains the status quo in terms of transportation facilities and services. It provides only facility maintenance, transit vehicle replacement, and other items required to maintain existing transit services and roadways. It also includes certain TSM improvements that are under construction, funded, or programmed for implementation in the near future. These TSM improvements include: creating a transit lane along First Street; making improvements such as street widening and signalization along Marina, Beach, and Laguna Streets between Doyle Drive and Bay Street; and making similar improvements along Bay Street between Laguna Street and the Embarcadero roadway. The No Project Alternative may be selected for implementation; as a do-nothing option, it also serves as a benchmark for evaluating the other alternatives.

Alternatives II-VI are described in the tables on the following pages. For each alternative, one page is used to summarize its major characteristics. The format of these tables is as follows. The left column lists the elements of the alternatives. This list is the same for all the alternatives. The middle column contains a description of the treatment of each element incorporated into that alternative. Where appropriate, the right column lists brief descriptions of possible design options and/or comments on the treatment of the respective element. Often the treatment of a particular element for two or more alternatives are very similar to, or the same as, one another. These similarities among alternatives are noted in the tables.

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	A two-lane entry ramp to the I-280 Freeway would be constructed between Third and Fourth Streets. The new on-ramp would extend from the Third and King Street intersection. The off-ramp approach to Fourth Street would be modified to provide passage of a third lane from the off-ramp into Berry Street.	
EMBARCADERO FREEWAY	The Embarcadero Freeway would remain essentially "as is." The addition of low-cost features, such as landscaping associated with Embarcadero roadway improvements, would improve its appearance. Six easterly columns of the freeway near Howard Street would be removed and affected portions of the freeway structure reconstructed to accommodate Embarcadero roadway improvements.	As an alternative to removing freeway columns, the Embarcadero roadway could be aligned to miss the columns, but this would encroach on the Ferry Building rights-of-way and the Embarcadero Promenade.
EMBARCADERO SURFACE ROAD	The Embarcadero roadway would be reconstructed to four lanes between Bay and King Streets and connected to the new I-280 on-ramp via a reconstructed roadway. Between Howard and Folsom Streets the roadway would be realigned inland along Steuart Street. The improved roadway would feature a landscaped median, a setback from the waterfront to provide pier and recreational access, intersection realignments, closed access to several streets and median turn pockets.	The roadway realignment between Howard and Folsom Streets would define the proposed waterfront park. In the Ferry Building segment the northbound lanes would lie east of the freeway structure, southbound lanes beneath it, and columns located in the median. Belt line access to piers would be maintained or restored.
Muni METRO/PCS* EXTENSION	This alternative would not include either the Muni Metro or PCS extension. It would include a Muni Metro underground turnback facility at the Embarcadero Station.	The turnback would have the flexibility to be expanded into a loop turnaround facility at a later date.
MUNI E-LINE	An upgraded new bus service along the Embarcadero roadway is proposed in-lieu of rail transit service. The new E-Line bus route would run from Fort Mason to the existing SP Depot. It could utilize modern buses, double deckers or vintage buses. In the Fisherman's Wharf segment portions of Beach and Jefferson Streets would provide exlcusive bus lanes.	In the Fisherman's Wharf segment, a design option would be to operate the E-Line two-way on Jefferson Street with Jefferson Street reconstructed as a transit/pedestrian mall. Local access would be permitted on the mall. This design option would reduce the number of parking spaces lost in the Fisherman's Wharf area by about 75 spaces.
STREET AND RAMP MODIFICATION	Street and ramp modifications are proposed to complement the reconstructed Embarcadero roadway and improve vehicular access. Improvements are located primarily in the South Beach/Rincon Hill and China Basin segments, and consist of improvements such as the addition of more thru and turn lanes, provision of one-way streets (e.g., Third and Fourth Streets) and provision of a reversible median transit lane along Second Street.	The major street modification in the project corridor would be the realignment of Brannan Street. This realignment would bisect the block bounded by the Embarcadero roadway, Brannan and First Street. This block is within the Rincon Point/South Beach Redevelopment Area. Several other blocks are similarly affected, but to a much smaller extent, by intersection modifications.
INTERCEPT PARKING	This alternative includes development of intercept parking facilities beneath the Bay Bridge, and in the area beneath the existing I-280 stub-end at Third Street and/or on the I-280 freeway deck itself. Up to 1,500 intercept parking spaces could be provided.	For this alternative 1,240 spaces would be lost due to exclusive bus lanes in the Fisherman's Wharf area and reconstruction of Embarcadero roadway. The addition of intercept parking spaces would not functionally replace spaces lost.
TSM IMPROVEMENTS	This alternative includes those TSM improvements included in Alternative 1, the Null Alternative. This and all alternatives also includes TSM improvements associated with other elements such as the relocation and modification of existing signals along the Embarcadero roadway as part of the Embarcadero roadway reconstruction.	* PCS =Peninsula Commute Service

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The freeway structure would be removed from the existing end at Third Street to the west side of Fourth Street. As in Alternative II, a new on-ramp would be constructed from the Third and King Street intersection, and the Fourth Street off-ramp modified to permit passage of a third lane to Berry Street.	As a design option for direct connection between the I-280 off-ramp and the Embarcadero roadway, Berry Street could be realigned east of Third Street to join King Street at Second Street.
EMBARCADERO FREEWAY	The existing structure and ramp connections to Fremont Street, Washington and Clay Streets, and Broadway would be removed. Existing connections at Beale and Main Streets would remain.	
EMBARCADERO SURFACE ROAD	Differences from Alternative II would include: variations in the median due to the provision of the E-Line streetcar and removal of the Embarcadero Freeway; changes in the vicinity of the existing SP Depot; provision of a 400-foot long drop off/parking bay in front of the Ferry Building; and the closure of North Point Street.	Changes in the vicinity of the SP Depot include widening of Fourth Street for a Muni Station on the east side of the street and a bus stop in front of the SP Depot. These facilities would be separated from the roadway by an island.
MUNI METRO/ PCS EXTENSION	The Muni Metro line would be extended from the Embarcadero Station to the existing SP Depot via Townsend Street. A car storage yard and maintenance facility would be located west of Sixth Street so that later extension of Muni Metro service to the south would be possible. An at-grade station between Howard and Mission streets would allow for transfers between the Muni Metro, the E-Line and the F-Line. North of this station the Muni Metro would enter a subway and connect with the existing Embarcadero Station.	An underground turnback facility would be provided at the east end of the Embarcadero Station. As in Alternative II, PCS service would not extend to downtown in this alternative.
MUNI E-LINE STREETCAR	E-Line rail service would be provided along the Embarcadero roadway from Fort Mason to the SP Depot. South of Howard Street, the E-Line would share tracks, stations and yard facilities with the Muni Metro extension. Exclusive transit lanes would be provided in the Fisherman's Wharf segment along Jefferson and Beach Streets. The E-Line would use a single track through Aquatic Park, and in Fort Mason a terminus would be located just east of Laguna Street.	North of Market Street stations would be located at the Ferry Building, Broadway, Lombard, Beach, Taylor and Hyde Streets. Vehicles for the E-Line could be vintage streetcars, metro-type LRV's or existing PCC cars.
STREET AND RAMP MODIFICATIONS	Street and ramp modifications in additon to those of Alternative II include improvements to King Street, widening the Embarcadero Freeway/Main Street exit ramp, closure of Main Street south of Mission Street, opening Davis Street between Clay and Washington Streets, and adding a bus lane to the SR-480 off-ramp from the Bay Bridge to allow for exclusive bus access to the Transbay Terminal.	The design of the proposed bus lane from the Bay Bridge to the Transbay Terminal would require further study during preliminary design.
INTERCEPT PARKING	Intercept parking could be provided beneath the Bay Bridge and on the block bounded by Fourth, Third, King and Berry Streets. However, because of the removal of the I-280 stub in this alternative, the latter site could be developed with other uses.	The addition of intercept parking spaces, because of their location, would not functionally replace some 1,400 spaces lost elsewhere.
TSM IMPROVEMENTS	TSM improvements would include those associated with treatment of other elements for this alternative and measures included in Alternative I.	

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The I-280 structure between Sixth and Third Streets, and the eastbound off-ramp at Fourth Street would be removed. A pair of new two-lane ramps would be constructed to connect the freeway with King Street near Sixth Street.	
EMBARCADERO FREEWAY	The Embarcadero Freeway would be removed from Beale Street to Broadway. In addition, the remaining structure would be reconstructed to accommodate an off-ramp exiting eastbound on the north side of Folsom Street at Spear Street.	Main Street would be closed between Folsom and Howard Streets because of the off-ramp.
EMBARCADERO SURFACE ROADWAY	The Embarcadero roadway would be reconstructed using the same general alignment and design as in other alternatives. Differences from other alternatives include reconstructing King Street to provide eight lanes from the new I-280 ramps and widening the roadway to five lanes between Bryant Street and Broadway (three lanes in the southbound direction).	Rail improvements (Muni Metro extension and E-Line) are located west of the Embar-cadero roadway between Howard and Second Streets, and in the E-Line median between Howard and Jefferson Streets. This is generally true for Alternatives III-VI.
MUNI METRO/ PCS EXTENSION	This alternative includes the Muni Metro extension, but not the PCS extension. In the Ferry Building segment there would be the provision of an underground turnaround loop east of the Embarcadero Station. The E-Line and F-Line would connect at the foot of Market Street in front of the Ferry Building. In the China Basin area the Muni Metro tracks would follow King Street alignment rather than Townsend Street.	The Muni terminal would have an underground connection with the SP Depot. The interface of the E-Line, F-Line and Muni Metro extension differs from Alternative III. A station would be located at Howard Street from which the E-Line would head east, while Muni Metro would continue north into a subway with a station near Mission Street. The F-Line would pass through Justin Herman Plaza and connect with the E-Line at the foot of Market Street.
MUNI E-LINE STREETCAR	E-Line rail service would be provided along the Embarcadero roadway from Fort Mason to the SP Depot. South of Howard Street, the E-Line would share facilities with the Muni Metro extension. Exclusive transit lanes would be provided in the Fisherman's Wharf segment along Jefferson and Beach Streets. The E-Line would follow King Street to the Embarcadero roadway in the China Basin segment.	In this alternative, the F-Line would extend across Justin Herman Plaza and connect with the E-Line at the foot of Market Street in front of the Ferry Building.
STREET AND RAMP MODIFICATIONS	Street and ramp modifications in addition to those of Alternative II include the closure of Steuart Street at Howard Street. Also, in order to accommodate the new Embarcadero Freeway off-ramp, the intersection of Spear and Folsom Streets would be redesigned.	
INTERCEPT PARKING	This alternative would include developing an intercept parking facility under the Bay Bridge between Harrison, Main, Bryant and Beale Streets.	As with Alternatives II and III, because of their location, the addition of intercept parking spaces would not functionally replace 2,150 spaces lost elsewhere.
TSM IMPROVEMENTS	In addition to those listed for Alternative I and those associated with other elements of this alternative, additional TSM improvements for this alternative would be to make Bay and North Point Streets one-way between Columbus Street and Van Ness Avenue and add signal interconnection along King Street and the Embarcadero roadway.	

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The I-280 structure between Sixth and Third Streets, and the eastbound off-ramp at Fourth Street would be removed. A pair of new two-lane ramps would connect to Berry and King Streets near Sixth Street.	
EMBARCADERO FREEWAY	The Embarcadero Freeway would be removed from Beale Street to Broadway. There would be provision of a new off-ramp exiting eastbound at Spear Street and a new on-ramp extending from the intersection of Howard Street and the Embarcadero roadway.	The new on-ramp would require Steuart Street to be closed south of Howard Street and the new off-ramp would require that Main Street be lowered under the ramp and narrowed to a two-lane width in order for Main Street to remain open in this alternative.
EMBARCADERO SURFACE ROADWAY	Reconstruction of the Embarcadero roadway would be essentially the same as Alternative IV. However, a significant difference would be that street and intersection modifications in the South Beach/Rincon Hill segment would conform with the Redevelopment Plan for that area (see Street and Ramp Modifications).	There are several design options with this alternative including: Pedestrian access by an underground or above grade crossing across the Embarcadero roadway in front of the Ferry Building; Several options for a Muni trolley bus turnaround in the Ferry Building area.
MUNI METRO/ PCS EXTENSION	Treatment of this element is similar to Alternative IV. Major differences with this alternative in the China Basin segment include locating the tracks on the north side of the reconstructed King Street rather than in the median, and the terminal would not include an underground passenger connection to the SP Depot.	
MUNI E-LINE STREETCAR	E-Line rail service would be provided along the Embarcadero roadway from Fort Mason to the SP Depot. South of Howard Street, the E-Line would share facilities with the Muni Metro extension. Two-way transit service would be provided along Jefferson Street, and it would be closed to through vehicular traffic and converted into a transit/pedestrian mall.	As a design option, an E-Line turnback and station could be added on the east side of Fourth Street. An underground pedestrian connection across Fourth Street would provide a protected interface between the E-Line station and the SP Depot. In the Ferry Building segment the F-Line would be routed south of Justin Herman Plaza and connect with the E-Line between Mission and Market Streets. A separated siding for the single track segment at Aquatic Park could be added when required by future operations.
STREET AND RAMP MODIFICATIONS	Unique to this alternative, street modifications in the South Beach/Rincon Hill segment are significantly different from Alternative II and are described in the "Design Options/Comment" column. Other street and ramp modifications for this alternative include closure of Market Street east of Spear Street; closure of Chestnut Street between the Embarcadero roadway and Montgomery Street; and connecting Kearny and Northpoint Streets.	Modifications in the South Beach/Rincon Hill segment would be consistent with the City's Northeastern Waterfront Plan. The Brannan Street realignment, described under Alternative II, would not occur. Examples of modifications include closing of Beale Street at the Embarcadero roadway, and connecting First and Townsend Streets with a two-lane roadway with no provision for access to the Embarcadero roadway.
INTERCEPT PARKING	This alternative includes development of an intercept parking facility beneath the Bay Bridge.	Addition of intercept parking spaces, because of their location, would not functionally replace 1,650 spaces lost elsewhere in this alternative.
TSM IMPROVEMENTS	TSM improvements would be the same as those described for Alternative IV.	

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The existing I-280 Freeway structure and Fourth Street off-ramp would remain. Two new 2-lane ramps would extend from Second Street to the existing stub-end of the freeway at Third Street.	
EMBARCADERO FREEWAY	The freeway structure would be removed from Beale Street to Broadway. An off-ramp connecting to Spear Street and an on-ramp extending from the intersection of Howard Street and the Embarcadero roadway would be constructed.	Treatment of this element would be the same as Alternative IVA.
EMBARCADERO SURFACE ROADWAY	The Embarcadero roadway would be reconstructed using the same general alignment and design as in other alternatives. In addition, in the China Basin segment extensive roadway changes would be made. From Bryant to Harrison Streets the Embarcadero roadway would be five lanes wide and in the Ferry Building area it would widen to six lanes. Two 400-foot-long drop-off and parking bays would be provided in front of the Ferry Building.	Changes in the China Basin segment include: closing King Street between Sixth and Third Streets and providing limited access between Second and Third Street; and providing two-way access along Berry Street between Second and Fourth Streets. The I-280 touchdown ramps would connect directly with the Embarcadero roadway at Second Street.
MUNI METRO/PCS EXTENSION	The Muni Metro extension would be provided and PCS service would be extended to the Rincon Annex in the downtown. The PCS extension would be an at-grade two-track line from China Basin to the water front, becoming a subway line north of Harrison Street to an underground station at Rincon Annex. The existing SP Depot would likely be replaced by a new station located adjacent to the proposed Muni Station west of Fourth Street. The Muni Metro extension would extend at-grade from Fourth and King Streets along the inland side of the Embarcadero roadway. It would enter a subway portal south of Howard Street. A subway station would be located north of Howard Street with an underground pedestrian connection to the PCS terminal at Rincon Annex.	The PCS extension would result in at-grade crossings at Fourth, Third, Second and Brannan Streets. The PCS extension would be enclosed by a continuous six foot high wall which would be breached only at street crossings. A Muni storage and maintenance facility would be located in the area bounded by the Fifth, Fourth, King, and Berry Streets. As in Alternative III, the Muni Metro extension would include a turnback facility at the east end of the Embarcadero Station.
MUNI E-LINE STREETCAR	E-Line rail service would be provided along the Embarcadero roadway from Fort Mason to the Ferry Building. Exclusive transit lanes would be provided in the Fisherman's Wharf segment along Jefferson and Beach Streets. E-Line service would not extend south of Market Street, but a yard lead would continue south from Market Street and connect to the Muni Metro tracks near Folsom Street.	Similar to Alternative IV, the F-Line would extend across Justin Herman Plaza and connect with the E-Line at the foot of Market Street in front of the Ferry Building.
STREET AND RAMP MODIFICATIONS	Street and ramp modification in addition to those of Alternative II include: extension of Berry Street to Seventh Street; extension of Sixth Street from Townsend to Berry Street; closing Fifth Street between Berry and King streets and extending it from Townsend to Berry Street; and closing Main Street between Harrison and Bryant streets.	The Bryant Street alignment would be similar to Alternatives II, III and IV, but a separated grade crossing over the PCS extension would be provided.
INTERCEPT PARKING	Intercept parking would be provided beneath the Bay Bridge.*	Addition of intercept parking spaces, because of their location, would not functionally replace 1,440 lost spaces lost elsewhere.
TSM IMPROVEMENTS	In addition to those listed for Alternative I and those associated with other elements of this alternative, additional TSM improvements for this alternative would be to make Bay and North Point Streets one-way between Columbus Street and Van Ness Avenue, and add signal interconnection along King Street and the Embarcadero roadway.	TSM improvements are similar to those for Alternatives IV and IVA.

ALTERNATIVE VA

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The treatment of this element would be the same as for Alternative V.	As a design option, a more northerly alignment of the ramps would have less impact on proposed parkland to the south, but could reduce traffic quality.
EMBARCADERO FREEWAY	Treatment of this element would be the same as for Alternative V.	
EMBARCADERO SURFACE ROAD	Treatment of the Embarcadero roadway would be essentially the same as in Alterative V. However, as a result of placing the PCS extension in a subway, the King Street right-of-way would be used for service access, the Muni Metro extension and a new two-lane roadway. This alternative also includes the closure of Mission Street at the Embarcadero roadway.	
MUNI METRO/ PCS EXTENSION	The major difference between Alternatives VA and V is the undergrounding of the PCS extension along its entire length. Muni Metro service, except for some track realignment in the China Basin segment, is essentially the same. The PCS extension would enter a subway portal just west of Fourth Street, proceed along the same alignment as the Muni Metro to Beale Street, at which point the PCS subway would turn inland and terminate at an underground station adjacent to the Transbay Terminal between Beale and Second Streets.	As in Alternative V the existing SP Depot would be replaced by a new station. Optional locations for a new station in the China Basin segment include west of Sixth Street or east of Third Street.
MUNI E-LINE STREETCAR	Treatment of the E-Line streetcar would be the same as for Alternative V except that in the Fisherman's Wharf area the westbound E-Line would follow Hyde Street between Beach and Jefferson Streets.	
STREET AND RAMP MODIFICATIONS	Treatment of this element would be the same as for Alternative V except for changes in the China Basin segment as noted above for the Muni Metro/PCS extension, closing Mission Street between Spear Street and the Embarcadero roadway, and keeping Main Street open to through traffic between Harrison and Bryant Streets.	A Bryant Street overpass between the Embarcadero roadway and Beale Street would not be required.
INTERCEPT PARKING	Treatment of this element would be the same as for Alternative V.	Addition of intercept parking spaces, because of their location, would not functionally replace 1,540 spaces lost elsewhere.
TSM IMPROVEMENTS	Treatment of this element would be the same as for Alternative V.	

ELEMENT	DESCRIPTION	DESIGN OPTIONS/COMMENTS
I-280 TOUCHDOWN	The existing I-280 Freeway structure and Fourth Street off-ramp would remain. Two new 2-lane ramps would extend from Second Street to the existing stub end of the freeway at Third Street.	Treatment of this element is the same as for Alternatives V and VA.
EMBARCADERO FREEWAY	The freeway structure would be maintained essentially as is with some landscaping improvements and the removal of six easterly columns near Howard Street.	Similar to Alternative II, a design option would be for the surface road to be aligned to clear the columns. However, this option would encroach on Ferry Building right-of-way and the Embarcadero Promenade.
EMBARCADERO SURFACE ROAD	The Embarcadero roadway would be realigned using the same general alignment and design as in other alternatives. The Embarcadero roadway would be reconstructed to four lanes between Bay and King Streets and connected to the new I-280 ramps via a reconstructed roadway. In the China Basin segment, extensive changes would be made to King and Berry Streets. A 400-foot-long drop-off parking bay would be provided for in front of the Ferry Building.	South of Bryant Street this element would be treated similar to Alternative V, and north of Bryant Street this element would be treated similar to Alternative II. The most significant difference would be locating the E-Line in the median of the roadway north of Howard Street, which Alternative II does not include.
MUNI METRO/ PCS EXTENSION	The Muni Metro line would not be extended to the existing SP Depot, but an underground turnback facility would be provided at the Embarcadero Station. PCS service would be extended to the Rincon Annex in the downtown. The PCS line would extend at-grade from China Basin along the side of the Embarcadero roadway. It would become a subway line north of Harrison Street traveling to an underground station at Rincon Annex.	The PCS extension would be at-grade to Harrison Street and would then proceed in a subway to the Rincon Annex. Design of the PCS extension is the same as Alternative V.
MUNI E-LINE STREETCAR	This alternative includes Muni E-Line rail service from Fort Mason to the existing SP Depot. Exclusive transit lanes would be provided in the Fisherman's Wharf segment along Jefferson and Beach Streets. Because there is no Muni Metro extension in this alternative, the E-Line would not share facilities with the Muni Metro. However, the location and design of E-Line facilities south of Howard Street would be similar to the design of the Muni Metro extension in Alternative V.	As in Alternatives IV and V, the F-Line would extend across Justin Herman Plaza and connect with the E-Line at the foot of Market Street in front of the Ferry Building. Unlike other alternatives which include the E-Line in the Ferry Building segment, the transition of the E-Line from Steuart Street to the median of Embarcadero roadway is located on the south side of Howard Street instead of on the north side.
STREET AND RAMP MODIFICATIONS	Street and ramp modifications in addition to those of Alternative II include those listed for Alternative V. This includes constructing a Bryant Street overpass to cross the PCS extension.	
INTERCEPT PARKING	This alternative would, as with other alternatives, provide intercept parking beneath the Bay Bridge.	Addition of intercept parking spaces, because of their location, would not functionally replace some 1,340 spaces lost elsewhere in this alternative.
TSM IMPROVEMENTS	In addition to those listed for Alternative I and those associated with other elements of this alternative, additional TSM improvements for this alternative would be to make Bay and North Point Streets one-way between Columbus Street and Van Ness Avenue, and add signal interconnection along King Street and the Embarcadero roadway.	TSM improvements for this alternative are similar to those for Alternatives IV and VA.

C. ENVIRONMENTAL IMPACTS AND MITIGATION

Chapter V of the Draft EIR describes the transportation, social, economic and environmental impacts associated with each of the eight alternatives. A summary of the most significant findings presented in Chapter V can be found in Section E of this chapter, Evaluation of Alternatives. Chapter VII of the Draft EIR provides a summary of major issues, including major impacts and mitigation measures. Included in the discussion of impacts in Chapter V is a discussion of mitigation measures. This was done because the impacts of one alternative are mitigated by other alternatives.

With respect to the social and community environment, the most significant changes would occur in the land use and urban design areas. Changes in developable land would range from a loss of 633,000 square feet to an increase of 705,000 square feet and new parklands would be created ranging in area from 273,000 to 412,000 square feet. A number of major urban design changes would occur, particularly relating to the pull-back of I-280 to Sixth Street, the Embarcadero Surface Roadway reconstruction, removal of the Embarcadero Freeway and implementation of the E-Line and/or Peninsula Commute Service extension. Loss of developable land would preclude development opportunities, and road and commuter rail improvements would reduce truck and rail access to waterfront areas, thereby adversely impacting maritime and commercial activities in that area. Key economic impacts from the project relate to the beneficial effects of construction and operating employment (from 34 to 200 permanent jobs) to the adverse impacts from business and employee displacement (from 9-73 business and 11-1,670 employees). Alternative V would have the most severe displacement impacts.

The traffic and transportation consequences of the alternatives are assessed in great detail. It is projected that the number of daily transit trips would range from 24,600 in Alternative I to 52,000 in Alternative VA. Changes in surface street traffic congestion ranges from 37 congested intersections and 55 block hours of queuing in Alternative II to 78 congested intersections and 139 block hours of queuing in Alternative III. Further, Alternatives III, IV, and IVA would result in freeway ramp capacity deficiencies.

In the area of the natural environment, no significant impacts were identified with respect to soils and geology, hydrology and water quality and ecology. Total energy consumption would be reduced in comparison to the No Project Alternative in Alternatives III through VI but would not be sufficient to "pay back" the energy required for

construction within the useful economic life of the project. For air quality impacts, the study identified from one to three intersections which would approach or exceed the State air quality standards. Alternative III would have the most severe air quality impacts. Significant changes in the noise environment would occur with various alternatives primarily depending upon the treatment of the Embarcadero Freeway and Peninsula Commute Service extension elements. Embarcadero Freeway removal would improve the noise environment in its vicinity, while implementation of the Peninsula Commute Service extension on the surface would have adverse noise consequences in its vicinity.

Implementation of any of Alternatives II through VI would have major construction impacts, primarily with respect to noise and pedestrian and vehicular circulation. With any of these alternatives, the most significant construction disruption would occur in the Ferry Building segment.

D. HISTORIC AND ARCHAEOLOGICAL RESOURCES AND PARKLANDS

An assessment of potential archaeological and historic resources within the Area of Potential Environmental Impact (APEI) was prepared. Twenty-eight historical resources which are listed on the National Register of Historic Places or are potentially eligible for this listing were identified. None of these resources would be adversely affected under Alternatives I and II, while four would be adversely affected with Alternatives III, IV, and IVA. Alternative V and VI would adversely affect seven resources, while Alternative VA would adversely affect eight resources, including the demolition of two buildings eligible for nomination to the National Register.

The project would also have beneficial effects on from two to eight historical buildings, depending upon the alternative selected.

The potential for discovery of subsurface historic archaelogical resources exists throughout the entire I-280 TCP project area. When projects are selected for implementation, it is proposed that detailed archival research be conducted to determine potential impacts, and careful monitoring will be conducted during construction so that data recovery programs can be instituted if necessary.

Section 4(f) of the Department of Transportation Act (49 USC 1653 (f)) requires that historic sites and publicly owned parklands not be used for transportation projects which

involve the use of federal funds, unless there is no feasible or prudent alternative, and all possible planning to minimize harm to such resources has been conducted. While not legally required as part of an EIR, for potential federal applications the I-280 TCP study assesses four parkland resources which could be affected by one or more of the alternatives. They are: Aquatic Park/Fort Mason; Justin Herman Plaza; the Embarcadero Promenade/proposed Rincon Point Waterfront Park; and the proposed South Beach Waterfront Park.

There would be potential impacts on one or more of these parkland resources with Alternatives III-VI, and a Section 4(f) Statement would be required if one of them was selected and federal funds were used.

E. EVALUATION OF ALTERNATIVES

1. Introduction

The major findings from the detailed assessment of the I-280 Transfer Concept Program Alternatives are summarized herein. It is not the purpose of this EIR to recommend a preferred alternative. Rather, it presents the necessary information and discussion so that the public and this region's decision-makers can apply their individual value judgments and reach their own conclusions. In presenting this material, the following framework is utilized:

- Effectiveness: How well do the alternatives help achieve the study's adopted goals and objectives?
- Efficiency: How cost-effective are the alternatives?
- Equity: Who are the net gainers and losers?
- Financial aspects: Are the alternatives affordable with available resources?
- Trade-off: What are the relative advantages and disadvantages?

2. Effectiveness (Goals Achievement)

The goals and objectives adopted by the study's Policy Control Committee on August 1, 1982, reflect local, regional, state, and federal concerns, and cover the nine subject areas shown in Table I-1. Ninety-nine specific measures were identified for 34 objectives to help assess how well each of the alternatives achieve the adopted goals. The results of

this investigation are summarized in Table I-1. Sufficient data are presented in the body of this document to permit individual assessments of goals achievement. Much of this data is summarized in Table I-2.

3. Efficiency (Cost-Effectiveness)

Another important consideration in alternatives evaluation is the relationship between the effectiveness of an alternative and its cost; or how efficient the alternatives are when compared to the baseline alternative. One common measure of transit efficiency is to relate the equivalent annual cost of transit investment to increases in annual ridership generated by such investment. The equivalent annual cost is the sum of annualized capital, operating and maintenance costs, taking into consideration the investment schedule, life cycles of capital items, and the prevailing discount rate associated with such an investment.

Table I-3 presents the transit efficiency of the alternatives, relative to Alternative I, in terms of equivalent annual cost per additional rider (projected year 2000 ridership). Relative to Alternative I, Alternatives III, IV and IVA are nearly equally efficient in transit investment, and are almost 2.5 times more efficient than Alternatives II and V. Alternatives VA and VI are on the lower end of the transit efficiency scale with Alternative VA being the least efficient in transit investment. In addition to cost per rider, Alternatives IV and IVA have added advantages over all other alternatives due to the Muni Metro subway turnaround loop which would significantly improve Muni Metro system capacity and operational efficiency.

Another measure considered in the efficiency analysis is peak period travel time through the corridor by both highway and transit users. Under this measure Alternative III would be the worst case because of Embarcadero Freeway removal without replacement ramps. Table I-4 shows the travel time reduction efficiency of the alternatives relative to Alternative III. In terms of equivalent annual cost per person-hour of travel time reduced, Alternatives I and II would actually show savings from Alternative III because they cost less than Alternative III. Among other alternatives, Alternative IVA would be most efficient, followed by Alternatives VI, V, IV and VA in decreasing order. It should be noted that the I-280 study scope does not include a detailed analysis of the regional impacts of each alternative outside the study corridor. Thus, from a regional perspective,

Table I-1

GOALS ACHIEVEMENT ANALYSIS - SUMMARY

GOAL AREAS (Not in Any Order of Priority)	I	II	III	IV	IVA	V	VA	VI
	ALTERNATIVE							
Transportation Service: Improve local and regional access through, to, and distribution within, the study area.	0	+	-	0	+	+	+	++
Urban Design and Land Use: Maintain and enhance the scenic, recreational and cultural values of the waterfront and its desirability as a place to live, work and visit.	F-1	A-5	A-3	A-2	A-1	F-2	A-4 (1)	F-3
Environmental Aspects: Preserve and enhance the environment.	0	0	+	++	++	-	-	--
Cost and Cost-Effectiveness: Develop a transportation system which is cost-effective and efficient in terms of benefits obtained for the investment required.	0	+	--	0	+	-	-	-
Financial Feasibility: Develop transportation based on a realistic estimate of resources; encourage cost-sharing by the private sector.	0	++	-	-	-	--	--	--
Equity Considerations: Provide transportation services that are designed to meet the needs of all segments of the population.	0	+	++	++	++	+	++	+
Economic and Social Factors: Provide a transportation system that stimulates social and economic revitalization of existing development in a manner consistent with other local and regional planning efforts.	0	0	+	+	+	++	++	+
Public Participation and Community Involvement: Develop transportation plans giving full consideration to the opinions of all segments of the public.	Study has a strong commitment to citizen participation. Framework has been established which will permit members of the public to express their suggestions and preferences at the public hearing on the Draft EIR Document.							
Institutional: Define a set of transportation projects acceptable to the City and County of San Francisco, the Metropolitan Transportation Commission and the California Department of Transportation as reflected in their individual goals and objectives.	**(To be assessed by each of the sponsoring agencies).**							

SYMBOLS

Performance Relative to the Status Quo (i.e. Alternative I: **the "no project" case):**

- ++ More Attractive
- \+ Somewhat More Attractive
- 0 About the Same
- \- Somewhat Less Attractive
- -- Less Attractive

(1) It should be noted that this summary rating for Alternative VA is a function of the currently studied alignment for the Peninsula Commute Service extension. This subsurface extension with a different alignment which takes advantage of joint development opportunities, depending upon its final design, could result in a much higher rating.

URBAN DESIGN RANKING SYSTEM

Positive Impacts	A-1	BEST
	A-5	
Negative Impacts	F-1	
	F-5	WORST

Table I-2
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

CHARACTERISTIC	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCSAt-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
	(Existing)	I	II	III	IV	IVA	V	VA	VI
TRANSPORTATION SERVICE		("Do Nothing")							
A. ADDED PERSON-HOURS OF TRAVEL (Year 2000 PM Peak)									
1. Highway Users	N.A.	2,400	1,900	5,400	5,300	4,200	4,500	4,600	2,400
2. Transit Users	(Not								
Due to Street Congestion	Appli-	1,600	1,100	3,400	3,300	1,700	1,800	1,600	1,300
Due to Transit Improvements	cable)	-100	-600	-1,500	-2,100	-2,100	-2,600	-2,700	-2,300
3. Total		3,900	2,400	7,300	6,500	3,800	3,700	3,500	1,400
B. DAILY TRANSIT RIDERSHIP (Base Case) [2]									
1. E-Line Bus or Streetcar	2,600	7,400	11,400	10,300	10,700	10,900	10,000	10,000	14,700
2. MUNI Metro Extension	N.A.	N.A.	N.A.	21,700	21,700	21,700	15,500	15,500	N.A.
3. Caltrain/SP Commuter Railroad	13,200	19,100	19,200	23,000	23,000	23,000	28,800	29,700	28,100
4. Total Linked Transit Trips	15,000	24,600	28,600	45,100	45,500	45,700	51,100	52,000	42,200
C. SURFACE STREET PERFORMANCE (PM Peak)									
1. Number of Congested Intersections	21	37	34	78	71	55	51	49	38
2. Block-Hours of Queueing [3]	20	55	49	139	128	75	75	68	47
D. ANNUAL VEHICLE MILES OF TRAVEL (Thousands)									
1. Reduction in Auto VMT Relative to Alternative I	N.A.	N.A.	400	14,800	14,800	14,800	22,700	25,900	11,900
E. PEDESTRIAN CONDITIONS - FERRY BUILDING									
1. Peak 15-Minute PM Pedestrian Volume	570	760	760	790	790	790	790	790	790
2. Embarcadero Roadway Vehicle Volume [4]	3,200	3,800	3,800	4,600	5,100	5,500	5,800	5,900	3,900
F. GOODS MOVEMENT [5, 6]									
1. Access to Freeways	N.A.	0	+	--	--	++	++	++	+
2. Access to Port	N.A.	0	-	-	-	0	-	-	-
3. Curbside Service	N.A.	0	-	--	--	0	--	-	--
4. Conflicts	N.A.	0	+	-	-	-	-	-	0
G. IMPACTS ON MUNI METRO SYSTEM OPERATIONS									
1. Capacity (Maximum Trains per Hour)	30	30	40	26	48	48	26	26	40
H. PARKING									
1. Number of Parking Spaces Lost	N.A.	80	1,240	1,440	1,450	1,650	1,440	1,540	1,340
2. Intercept Parking Potential (Maximum) [7]	N.A.	0	1,500	3,600	3,600	1,900	1,900	1,900	1,900

Table 1-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS 1

CHARACTERISTIC	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCSAt-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
	(Existing)	I	II	III	IV	IVA	V	VA	VI
		("Do Nothing")							
URBAN DESIGN 8									
A. ASSESSMENT OF ELEMENTS 5									
1. I-280	N.A.	0	0	0	++	++	-	-	-
2. Embarcadero Freeway	N.A.	0	0	+	+	++	++	++	0
3. Embarcadero Surface Road	N.A.	0	+	++	++	++	++	++	+
4. MUNI Metro Extension	N.A.	0	0	0	0	0	+	+	0
5. SP Extension *	N.A.	0	0	0	0	0	--	-	--
6. E-Line	N.A.	0	0	++	++	++	+	+	++
7. E-Line/F-Line Connections	N.A.	0	0	-	--	0	--	--	--
ENVIRONMENTAL ASPECTS									
A. USABLE LAND GAINED OR (LOST) 9									
1. Total Developable land (Thousand sq. ft.)	N.A.	N.A.	(206)	(172)	705	448	(545)	(445)	(633)
2. Total Parkland (Thousand sq. ft.)	N.A.	N.A.	412	310	273	275	364	364	384
B. ECONOMIC IMPACTS									
1. Construction Employment (person-years)	N.A.	0	2,765	5,875	7,465	7,280	12,440	17,300	10,410
2. Operating Employment (jobs added)	N.A.	34	103	200	193	200	181	191	146
3. Business and Parking Lots Displaced	N.A.	0	9 & 2 lots	9 & 2 lots	12 & 3 lots	11 & 3 lots	22 & 3 lots	73 & 3 lots	20 & 2 lots
4. Employees Displaced	N.A.	0	29	29	19	11	59	547 - 1,670	42
C. CHANGES IN ANNUAL ENERGY CONSUMPTION									
1. Equivalent Barrels of Oil Saved (Lost) 10	N.A.	N.A.	(980)	1,600	2,100	5,500	8,900	11,800	4,500
D. AIR QUALITY 11									
1. No. of Sites Near or Exceeding State Standards	9	1	1	3	2	2	2	1	1
2. No. of Sites Near or Exceeding Federal Standards	6	0	0	0	0	0	0	0	0
E. NOISE 5, 12	N.A.	0	0	+	+	+	+ and -	+	-
F. CONSTRUCTION IMPACTS 5, 13	N.A.	0	-	-	-	-	-	-	-
G. HISTORIC, ARCHAEOLOGICAL AND PARKLAND									
1. Number of Historical Resources Demolished	N.A.	0	0	0	0	0	0	2	0
2. Number of Historical Resources with Minor Adverse Impacts	N.A.	0	0	4	4	4	7	6	7
3. Number of Historical Resources with Beneficial Impacts	N.A.	0	4	8	8	8	8	8	3
4. Archaeological Impacts	N.A.	No	No 14	Yes 14	Yes 14	Yes 14	Yes 14	Yes 14	Yes 14
5. Section 4(f) Statement Required (assumes Federal funding)	N.A.	No 15	No	Yes 16, 19	Yes 16, 17, 18 19	Yes 16, 18, 19	Yes 16, 17, 19	Yes 16, 17, 19	Yes 16, 18, 19

* It should be noted that this summary rating for Alternative VA is a function of the currently studied alignment for the Peninsula Commute Service (SP) extension. This subsurface extension with a different alignment which takes advantage of joint development opportunities, depending upon its final design, could result in a rating of + or even ++.

Table I-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

CHARACTERISTIC	E-Line Metro/PCS Ext. EMB. RD. EMB. FWY. I-280 (Existing)	I ("Do Nothing")	Bus Turn-back 4 Lanes Stays On-Ramp II	Rail FM-SP to SP W. Turn 4 Lanes Remove On-Ramp III	Rail FM-SP to SP W. Loop 4-6 Lanes Remove + Off Back to 6th + On, Off IV	Rail FM-SP to SP W. Loop 4-6 Lanes Remove + On, Off Back to 6th + On, Off IVA	Rail FM-MKT. MM & PCS At-Grade 4-6 Lanes Remove + On, Off On-Off Ramp V	Rail FM-MKT. MM & PCS Subway 4-6 Lanes Remove + On, Off On-Off Ramp VA	Rail FM-SP Turnback PCSAt-Gr. 4 lanes Stays On-Off Ramp VI
H. GEOLOGY AND HYDROLOGY	(No Significant Impacts for Any of the Alternatives)								
J. ECOLOGY	(No Significant Impacts for Any of the Alternatives)								
CAPITAL AND OPERATING COSTS									
A. CAPITAL COSTS (Millions of 1983 Dollars) [20]									
1. I-280 Touchdown	N.A.	0	7.4	8.0	20.9	23.3	7.9	7.9	7.9
2. Embarcadero Freeway	N.A.	0	0	8.9	15.7	20.5	20.4	20.4	0
3. Embarcadero Surface Road	N.A.	0	31.7	25.3	36.5	38.7	24.2	24.5	29.2
4. Street and Ramp Modifications	N.A.	0	0.1	2.9	3.6	4.7	7.4	8.3	4.5
5. Intercept Parking	N.A.	0	6.7	37.0	36.0	36.0	36.0	36.0	36.0
6. TSM Improvements	N.A.	0.6	0.6	0.6	1.3	1.3	1.3	1.3	1.3
7. Subtotal: Highway Elements	N.A.	0.6	46.5	82.8	114.0	124.5	97.1	98.4	78.9
8. MUNI Metro Extension	N.A.	0	31.0	77.8	83.6	73.0	77.6	76.6	31.0
9. Caltrain/SP Extension	N.A.	0	0	0	0	0	170.7	329.2	170.7
10. E-Line	N.A.	3.6	4.1	18.3	19.9	21.3	19.4	19.9	37.3
11. Subtotal: Transit Elements	N.A.	3.6	35.1	96.1	103.5	94.3	267.8	425.7	239.0
12. Grand Total:	N.A.	4.2	81.6	179.0	217.5	218.8	364.9	524.1	317.9
B. OPERATING & MAINTENANCE COSTS (Millions) [21]									
1. I-280 Touchdown	N.A.	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
2. Embarcadero Freeway	N.A.	0.1	0.1	0	0.0	0.0	0.0	0.0	0.1
3. Embarcadero Surface Road	N.A.	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1
4. Street and Ramp Modifications	N.A.	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5. Intercept Parking	N.A.	0	0.6	1.5	1.3	1.3	1.3	1.3	1.3
6. TSM Improvements	N.A.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7. Subtotal: Highway Elements	N.A.	0.3	0.9	1.8	1.7	1.7	1.7	1.7	1.7
8. MUNI Metro Extension	N.A.	0	0.1	2.6	2.6	2.6	2.0	2.0	0.1
9. Caltrain/SP Extension	N.A.	0	0	0	0	0	0.2	0.2	0.2
10. E-Line	N.A.	1.0	3.9	4.3	4.3	4.4	3.0	3.0	4.4
11. Subtotal: Transit Elements	N.A.	1.0	4.0	6.9	6.9	7.0	5.2	5.2	4.7
12. Grand Total:	N.A.	1.3	4.9	8.8	8.7	8.7	6.9	6.9	6.4

Table I-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCS At-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
CHARACTERISTIC	(Existing)	I	II	III	IV	IVA	V	VA	VI
		("Do Nothing")							
C. EQUIVALENT ANNUAL COSTS (In Millions) [22]									
1. I-280 Touchdown	N.A.	0.1	0.6	0.6	1.4	1.6	0.6	0.6	0.6
2. Embarcadero Freeway	N.A.	0.1	0.1	0.6	1.1	1.4	1.4	1.4	0.1
3. Embarcadero Surface Road	N.A.	0.1	2.3	1.8	2.7	2.8	1.7	1.8	2.1
4. Street and Ramp Modifications	N.A.	---	0.1	0.2	0.3	0.3	0.6	0.7	0.4
5. Intercept Parking	N.A.	---	0.8	3.5	3.3	3.3	3.3	3.3	3.3
6. TSM Improvements	N.A.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7. Subtotal: Highway Elements	N.A.	0.3	3.9	6.8	8.9	9.6	7.8	7.9	6.6
8. MUNI Metro Extension	N.A.	---	2.1	6.7	7.1	6.3	6.2	6.1	2.1
9. Caltrain/SP Extension	N.A.	---	---	---	---	---	11.5	21.9	11.5
10. E-Line	N.A.	1.5	3.1	3.6	3.7	3.9	3.0	3.0	5.0
11. Subtotal: Transit Elements	N.A.	1.5	5.1	10.3	10.8	10.2	20.7	31.0	18.6
12. Grand Total:	N.A.	1.8	9.0	17.2	19.8	19.8	28.5	38.9	25.2
FINANCIAL ASPECTS									
A. CAPITAL COSTS									
1. Transfer Concept Fund Shortfall [23]	N.A.	N.A.	0.3	144.5	190.0	189.3	426.6	529.1	338.4
2. Percent of Transit Funds Required [24]	N.A.	N.A.	0	8	9	9	21	33	17
3. Remaining Highway Funds Required [25]	N.A.	N.A.	0	28.5	35.1	37.0	62.6	63.5	59.3
4. Local Matching Funds Required [26]	N.A.	N.A.	15.7	36.5	41.4	40.6	86.2	113.2	71.1
5. Potential for Private Sector Cost Sharing	See Note 27								
B. OPERATING COSTS									
1. Percent of City's Street Maintenance Funds Required [28]	N.A.	2.4	3.2	4.7	4.8	5.1	4.2	4.7	3.4
2. Percent Increase in MUNI Operating Deficit Required [29]	N.A.	(0.2)	1.5	2.0	1.9	2.0	1.8	1.8	1.6
SOCIAL AND EQUITY FACTORS [30]	N.A.	C	B	A	A	A	B	A	B
PUBLIC PARTICIPATION & INVOLVEMENT [31]	See Note 31								
INSTITUTIONAL CONSIDERATIONS [32]	See Note 32								

Notes to Accompany Table I-2: SUMMARY OF SIGNIFICANT CHARACTERISTICS

1. Not in any particular order of priority.

2. Year 2000 projections for baseline estimates of downtown growth.

3. The summation of the number of blocks when queuing would be present, multiplied by the number of hours duration.

4. Two-way PM peak-hour vehicle volume.

5. Symbols (Performance Relative to Alternative I, the "No Project" case.)
++ More attractive; + Somewhat more attractive; 0 about the same; - Somewhat less attractive; -- Less attractive.

6. Ratings are for goods movements along the waterfront; ratings for the Financial District could be lower in Alternatives IVA, V and VA due to congestion spill-over.

7. In multi-level parking structures at the stub end of I-280 and under the Bay Bridge approach. Because of their location, intercept parking spaces are not replacements for spaces removed from other locations.

8. Composite ratings are shown; see Working Paper 2.2.14 for a detailed treatment for each of eight urban design objectives.

9. Thousands of square feet; relative to Alternative I.

10. Relative to Alternative I. None of the Alternatives would recover the construction energy required to build them during the economic life of the project through the induced changes in annual energy consumption. Pay-back periods range from a minimum of 175 years for Alternative IVA through no pay-back ever for Alternative II.

11. Curbside carbon monoxide concentrations; state standards are 20 ppm for an 8 hour period; federal standards are 35 ppm for an 8 hour period, 9 ppm for a 1 hour period.

12. Few locations would experience a noticeable change in noise levels (3 or more decibels) with two notable exceptions: the at-grade Peninsula Commute Service extension would significantly increase noise levels in the China Basin and South Beach/Rincon Hill Areas (Alternatives V, VI); there would be a noticeable improvement of the noise environment in the area of the Ferry Building resulting from removal of the Embarcadero Freeway (Alternatives III - VA).

13. Construction activity for Alternatives II-VI would produce varying degrees of short-term inconvenience and disruption in the form of temporary restrictions of access, temporary land use changes, traffic delays, rerouting of transit service, pedestrians, detours, and impacts on nearby areas from noise and dust generation.

14. The probability and extent of archaeological impacts increases in proportion to the extent of underground construction.

15. The No Project Alternative would not involve any major government actions, even though the No Project Alternative would hinder development of the proposed Rincon Point and South Beach parks and would not accomplish the Master Plan of San Francisco or of the Golden Gate National Recreational Area.

16. The E-Line traverses Aquatic Park/Fort Mason.

17. The F-Line across Justin Herman Plaza.

18. Construction disruption to Justin Herman Plaza from the Muni Metro turnaround.

19. The proposed Rincon Point and/or South Beach parks would be smaller than proposed in the adopted redevelopment plan.

20. Includes transit vehicle costs; "base case" construction cost; 25 percent contingency factor for construction and related design costs; 15 percent engineering and administration; and 10 percent agency costs for right-of-way acquisition. Costs will vary with design options selected.

21. January, 1983 dollars; includes 25 percent contingency factor; "equiliberated" i.e. - costs reflect balancing of service provided against patronage forecast.

22. Based on: construction starting September, 1986; analysis period of 50 years after construction (i.e. through 2039); discount rate of 10 percent; useful lives of 50 years for physical facilities; 12 years for buses, 30 years for light rail vehicles and 20 years for vintage streetcars. Total for both capital, operating and maintenance costs on an annualized basis which reflects the useful economic lives of the project components.

23. In millions of dollars; capital costs inflated at 8 percent to midpoint of year of expenditure; total concept program funding constant at $104,470,000 which includes a 15 percent local match.

24. Percent of federal and state transit capital and operating funds potentially available to the region; average required over the duration of the construction period.

25. In millions of dollars; assumes 100 percent allocation to this project of certain funding sources available to the region and what is shown in the table is the amount which is still unfunded.

26. Total local funds required to match potential federal allocations for the project; inflated dollars at 8 percent. These do <u>not</u> include the unfunded remaining highway costs shown immediately above.

27. Several opportunities exist for private sector cost sharing. These include: joint development potential at the Transbay Terminal site in connection with Peninsula Commute Service extension (Alternative VA); development assessments associated with Embarcadero Freeway removal and I-280 pull-back to Sixth Street; development opportunities in the China Basin - existing SP terminal area, and construction/ operation of the intercept parking facilities. NOTE: The current analysis assumes that both the Embarcadero Freeway removal and demolition of the I-280 Freeway back to Sixth Street are eligible for transfer concept program funding. This may not be so, and indeed a repayment of federal monies may be required if the I-280 Freeway is partially demolished.

28. The City's budget for street maintenance for fiscal year ending June 30, 1983 was $5,566,213.

29. Muni's projected operating budget deficit is $104,746,000.

30. Ranked after consideration of each alternative's ability to help attain the goal of providing transportation services that are designed to meet the needs of all segments of the population, including: enhancing the mobility of the transportation disadvantaged; developing a transportation plan which does not unfairly distribute benefits or costs among various groups, consistent with other objectives sought; and minimizing the displacement of minority, low-income and other communities. It should be particularly noted that with the exception of relocation of a few houseboats in Mission Creek, none of the alternatives would displace any residential units.

    Key: "A" designates most beneficial, "B" intermediate, and "C" least beneficial.

31. The I-280 TCP has a strong commitment to citizen participation and has encouraged the public to become involved in all aspects of the project. Processes were developed for periodic feedback to help guide study staff and provide input to the decision-makers. No clear cut consensus has emerged either for or against any of the alternatives or elements. While strong advocates and opponents exist, many have expressed the need for more information as a basis for assessment. This information is now made available through the Draft EIR and associated presentations of that document. Consequently, a framework has now been established which will permit members of the public to express their reactions and preferences at the formal public hearing on the draft document. In addition, there will be other opportunities for public input at other public meetings and through the normal political process.

32. The I-280 TCP goal in the institutional area is to define a set of transportation projects acceptable to the City and County of San Francisco, the Metropolitan Transportation Commission and the Department of Transportation as reflected in the individual goals and objectives of these agencies. The selection of projects for implementation by each of these agencies will constitute a "de facto" assessment of the alternatives vis-a-vis the institutional goals statement.

Table I-3
TRANSIT EFFICIENCY (COST-EFFECTIVENESS)

- EQUIVALENT ANNUAL COST[1] OF ADDING ANNUAL TRANSIT RIDERS
(Relative to Alternative I, in dollars per additional rider)

Alternative	Muni-Metro Extension	Peninsula Commute Service Extension	E-Line	Linked Transit[2]
I	N.A.	N.A.	N.A.	N.A.
II	N.A.	N.A.	$1.08	2.49
III	$1.07	N.A.	$1.96	$1.04
IV	$1.13	N.A.	$1.84	$1.08
IVA	$1.00	N.A.	$1.84	$1.00
V	$1.38	$4.25	$1.49	$2.34
VA	$1.37	$7.37	$1.52	$3.52
VI	N.A.	$4.58	$1.40	$3.41

[1]Transit Investment Only; total annualized capital, operating and maintenance costs.

[2]Includes Peninsula Commute Service ridership increases, but excludes duplication of transfers between transit modes.

Table I-4
TRAVEL TIME REDUCTION EFFICIENCY (COST-EFFECTIVENESS)

- EQUIVALENT ANNUAL COST[1] OF REDUCING
ANNUAL PM PEAK TRAVEL HOURS IN THE EMBARCADERO CORRIDOR
(Relative to Alternative III, in dollars/person-hour)

Alternative	$ Cost (Saving) Per Person-Hour of Travel Time Reduced
I	(18.0)
II	(6.7)
III	N.A.
IV	$13.0
IVA	$3.1
V	$12.6
VA	$20.6
VI	$5.5

[1]Grand Total Cost: Highway and Transit Elements; total annualized capital, operating and maintenance costs.

certain elements of the I-280 Transfer Concept Program, such as the Peninsula Commute Service extension in Alternatives V, VA and VI, could be more cost-effective than indicated above.

Overall, Alternatives V, VA and VI are assessed to be less cost-effective than Alternative II, IV and IVA. Alternative III is assessed to be least cost-effective overall among all alternatives primarily because of its adverse impact on city streets. It is emphasized that, while an important factor, cost-effectiveness is only one of several aspects to be considered in the evaluation process. An alternative can be very cost-effective (because of lower cost) while deficient in transportation service or failing to help achieve other goals.

4. Equity Considerations

This section examines each of the major elements of the Transfer Concept Program from the point of seeing which geographic and socio-economic jurisdictions and groups are benefited by each element and which are likely to be worse off if it were implemented.

In the limited space available for this Summary chapter, only the section dealing with Embarcadero Freeway Removal is presented below, but a similar discussion can be found in the body of this document for the I-280 Touchdown Ramps, Embarcadero Surface Roadway, Muni Metro Extension, Peninsula Commute Service Extension, E-Line, Intercept Parking Facilities and Transportation Systems Management (TSM) improvements.

For the Embarcadero Freeway removal, local property owners and developers would gain the benefit of increased property values and development potential. Recreational users and nearby residents would benefit from increased open space and an enhanced environment (except during peak-traffic hours when conditions would worsen due to increased traffic congestion).

Motorists from the Central Business District (CBD), Chinatown, and adjacent Embarcadero area who are traveling to/from San Mateo, Santa Clara, and southern parts of San Francisco would find their travel speeds diminished and their probability of encountering delays increased. The same is true for local auto and truck circulation and some bus transit users. Impacts can be mitigated through the addition of on/off ramps. Pedestrians in the area would continue to find exposure to accidents and encounter delays in crossing the Embarcadero Freeway because of increased surface traffic.

5. Financial Aspects

A detailed financial plan for the TCP alternatives is not required until after selected projects are advanced for implementation. However, funding requirements of each alternative were reviewed and potential funding sources were identified as a part of this study. Some of the major findings were:

- Only Alternative II can be funded virtually in its entirety with transfer funds.
- More funds are potentially available for transit than highway elements.
- Unfunded highway needs range from \$28.5 million for Alternative III to \$63.5 million for Alternative VA (inflated dollars).
- Transit projects would require from 8% (Alternative III) of all transit capital and operating funds potentially available to the region, to 33% of such funds (Alternative VA).
- Local matching capital funds required range from \$15.7 million (Alternative III) to \$113.2 million (Alternative VA) in inflated dollars. This amount does not include the highway shortfall.
- All alternatives contain some elements/treatments capable of being funded with the transfer fund.
- Various "packages" of elements/treatments, recombining portions of different alternatives, are also possible.
- Depending upon the nature of the staging program or recombination of elements /treatments, additional analytical work and impact assessment may be required should a staging program or recombination of elements/treatments be chosen as the preferred alternative.
- Operating costs for the Embarcadero Roadway and other street elements would require from about 2% (Alternative I) to 5% (Alternative IVA) of the City's current street maintenance budget.
- Transit element operations and maintenance would increase Muni's operating deficit by 1.5% (Alternative II) to 2.0% (Alternative IV). The No Project alternative (Alternative I) would have a slight operating surplus.
- The analysis assumes that the costs of Embarcadero Freeway removal and I-280 pullback are both eligible for transfer program funding. This may not be so and I-280 pullback may even involve paying back the federal funds used in its construction.
- Several potential opportunities exist for private sector cost-sharing, such as: Ferry Building and Mission Bay assessment districts; joint development at the Transbay and Peninsula Commute Service Terminals and at China Basin; and intercept parking situations.

6. Trade-off Analysis

It is clear from an examination of the material presented in this document that each treatment for each element of each alternative has certain individual advantages and disadvantages. The selection of components making up a locally preferred alternative will therefore depend upon how decision-makers view the relative importance of these various strong points and drawbacks.

It is anticipated that selection of a locally preferred alternative will involve making a series of choices. Clearly, the first question to be resolved is whether or not to do anything at all. The material presented in Chapter II, Section C., Purpose and Need, and elsewhere in the body of this document reporting on the assessment of Alternative I provides the basis for such a decision (coupled, of course, with testimony provided through the public hearing process).

If it is decided not to select the No Project Alternative option, a logical next step would be to examine Alternative II since it can be virtually fully funded through the Transfer Concept Program, and assess whether it sufficiently serves identified needs or whether further investments in additional improvements are required. Note that Alternative II (or any of the alternatives for that matter) need not be exactly as currently defined but could involve design options and "mix and match" treatments of elements. (Additional analytical work and impact assessment may be required depending upon the options or combinations selected.)

The making of this decision as well as subsequent ones will be directly dependent on the value judgments of the decision makers. The various alternatives provide greater or lesser improvements in cost-effectiveness, environmental improvements, additional transit ridership, and so on. In practice, of course, most decision makers, like most people, will be concerned about all of these factors and will seek to reach the best compromise possible.

F. COMMUNITY INVOLVEMENT/CITIZEN PARTICIPATION

Public involvement has been encouraged in all aspects of the I-280 TCP study. The public involvement program included newsletters, surveys, questionnaries, encouragement of media coverage, interviews with key leaders, meetings with community groups, and workshops.

Interviews with key Bay Area leaders (not a statistically significant sample) indicated general interest in implementing each of the various TCP elements, including removal of the Embarcadero Freeway. About 35% of respondents favored extension of Peninsula Commute Service to downtown. In addition, those interviewed endorsed the TCP goals and objectives.

Another method of citizen participation was public workshops. The first workshop reviewed the proposed TCP goals and objectives. A second set of workshops grappled with identifying alternatives to be assessed during the study. Information was disseminated to and solicited from the public through four project newsletters. A further opportunity for citizen involvement will be at the public hearing on the contents of the Draft EIR.

G. OUTSTANDING ISSUES AND REFINEMENTS

The two major unresolved issues which need to be addressed prior to completion of this project are the development of a financing program of projects selected for implementation and a decision with respect to various design systems and refinements which are currently under consideration for a number of the project elements.

Staff of the Metropolitan Transportation Commission, in cooperation with the City and Caltrans will prepare a financing program for capital costs should projects be selected for implementation. Similarly, the City and Caltrans will develop an operating and maintenance financing program at the same time.

In addition to developing planning concepts required as a basis for comparison among alternatives, this study has also examined and evaluated a number of design options and refinements. These are listed in Section B, Alternatives, and include such items as shifts in the location of the Muni Metro extension portal in an effort to minimize traffic impacts, shifts in I-280 Touchdown ramp alignments to improve design standards, changes in local street configurations to permit better traffic circulation, provision of grade-separated pedestrian crossings at the Ferry Building and existing SP Depot to enhance safety and traffic operations, changes in the Muni trolley bus turnaround facility layout at the foot of Market Street to improve transit operations, and so on. When projects are selected for implementation, the appropriate corresponding elements and their options should be reviewed so that the projects represent the designs considered to be most appropriate. Further refinements, of course, may also be required during the engineering design phase leading to project implementation.

H. COMMENTING ON THE DRAFT EIR

A 45-day period has been set for receipt of comments on the Draft EIR. Comments should be sent to:

Mr. William Chastain
Caltrans
P.O. Box 7310
San Francisco, CA 94120

Comments must be received by November 30, 1984.

II. PROJECT DEFINITION AND PURPOSE AND NEED FOR ACTION

INTRODUCTION

This Draft Environmental Impact Report (DEIR) is for the "project" known as the I-280 Transfer Concept Program (TCP) in San Francisco. Established in late 1980 by the California Department of Transportation, the City and County of San Francisco and the Metropolitan Transportation Commission, the I-280 TCP is a program of highway, street, transit, terminal and other transportation-related improvement proposals for the northeastern waterfront area of San Francisco (see Figure II-1). The TCP improvements are being proposed as substitutes for the withdrawn segment of I-280 originally planned to link the existing I-280 stub-end at Third Street with the Embarcadero Freeway and the San Francisco-Oakland Bay Bridge. As such, they are potentially eligible for funding by the Interstate Transfer Funds made available by the withdrawal of the originally planned I-280 segment from the Interstate Highway System.

The I-280 TCP is made up of several elements, which are described in the Program Elements section of this chapter. Each element defines a broad concept for highway, street, transit, terminal, or related transportation improvements for the project area. Since a number of alternative ways are possible to implement a concept (see Chapter III for description of Alternatives), more detailed information is needed on the Alternatives and their respective impacts on the project area before the TCP can be implemented. Also, the estimated cost of the TCP exceeds the Interstate Transfer Funds potentially available for this project. A detailed analysis of the alternatives and their impacts would assist in the choice of substitute projects which could be advanced for implementation with available funds. The I-280 TCP Study has been undertaken to provide the needed information.

The completion of a Program EIR is a required step in the development of any major transportation project. This Draft Environmental Impact Report has been developed consistent with applicable state and local regulations. Its purpose is to provide interested citizens, elected officials, and government agencies with the information necessary to

make an informed choice of which transportation improvements should be made to the northeastern waterfront area of San Franicsco. This document provides information on eight alternatives to implement the TCP, but does not present a conclusion as to the best alternative. Information contained in this report was developed in an objective fashion in order to call on the reader to make a fair judgment as to which projects should be advanced for further development and implementation.

This DEIR also serves as a Systems Planning Report in the federal environmental process. It is a step leading to the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) on projects advanced for further development. For the projects advanced for further development subsequent activities will include preliminary engineering and preparation of environmental analyses pursuant to the National Environmental Policy Act guidelines. This work would be followed by final design, right-of-way acquisition and construction.

The following sections of this chapter provide a description of the project area and its regional setting, a summary of the TCP's background and history, a description of the program elements and of the need for transportation improvements in the project area and a listing of the project's goals and objectives.

A. BACKGROUND

1. Regional Setting

The I-280 TCP projects are located in the northern and northeastern waterfront areas of San Francisco (see Figure II-1). They are an important part of the ongoing planning and development process taking place in the area.

The project area, referred to as the Embarcadero Corridor, is a significant transportation corridor, providing access to the downtown, waterfront piers and the South of Market, Chinatown, North Beach, Telegraph Hill, Fisherman's Wharf and Fort Mason areas of San Francisco. Four major freeways provide access between the project area and other points in San Francisco, the Peninsula, the East Bay, and Marin County. Routes 101 and I-280 extend to the Peninsula and Marin, while routes I-80 and SR-480 provide direct access to the San Francisco-Oakland Bay Bridge.

REGIONAL LOCATION MAP

SCALE 0 1 2 4 MILES

II-1

The project area is also a valuable city and regional resource. There is substantial demand by residents, commuters, and visitors for a variety of uses related to residential, office, industrial, tourism, recreation, and shipping activities as well as transportation.

The project area is part of the nine-county San Francisco Bay Area. The 1980 population of the nine-county Region was 5,179,784, with San Francisco's population consisting of 678,974 people. The Bay Area is the second largest metropolitan area in the western United States. San Francisco, San Jose, and Oakland are the three largest incorporated cities in the Bay Area and are also major regional employment centers.

Early settlement in the region focused on maritime and agricultural activities. During the Gold Rush, from 1848 to 1860, San Francisco experienced rapid growth, becoming the major urban center along the entire West Coast. In addition to commercial, financial, real estate and transportation activities, manufacturing became an important activity in the late 1800s. Much of San Francisco's industry was located in the southeastern portion of the City to take advantage of access to the City's piers and the availability of relatively flat land. Much of this flat land (such as China Basin) was made available by landfilling in the San Francisco Bay. An extensive rail network was developed in the eastern portion of the City, connecting the City's industrial area and port with outlying areas.

Land in San Francisco historically has been developed at high densities because of the City's confinement on three sides by water and its rugged, hilly terrain. Early expansion of the densely developed business and residential district north of Market Street was complemented by growth of lower density industrial and maritime-related districts south of Market Street. The street grid of the South of Market area reflected the need to move imported and manufactured goods from the waterfront down the Peninsula along the rail (and later highway) corridors that served the rest of the state via San Jose.

With the development of efficient ferry and streetcar networks in the 1890s the City began to serve as the employment and market center for the burgeoning Bay Area. This trend was intensified by the construction of bridges, highways, and tunnels from the late 1930s on, linking all areas in the nine-county Bay Area and creating an integrated regional economy. Rapid growth has continued during this century, accelerating throughout the region since the 1950s. Originally, growth in the outlying areas consisted primarily of

residential development, with employment growth occurring in central areas. Since World War II, industrial development has been attracted to outlying areas by the availability of less expensive land and good access to the interstate highway system. The development of Oakland's containerized port and other ports at Richmond and along the Carquinez Strait have also contributed to industrial development. More recently, an increasing portion of the region's office development has been occurring in outlying areas. Most notable is the high technology research and development activity in northern Santa Clara County. Other areas such as Marin County, Walnut Creek and Pleasanton are also increasing their available office and light industrial space.

The shift of industrial and shipping activities away from San Francisco has produced many transitions in land use, especially within the Embarcadero Corridor. However, many of the northern waterfront piers (40, 38, 36, 34, 30-32, 28, 26, 9, 15-17, 19-23, 27-29, 31, 33, 35) are still in active maritime use. Much of the corridor is experiencing shifts in land use from shipping, warehousing, and manufacturing uses to more dense commercial, office, and residential uses. These transitions are creating demand for access for tens of thousands of new workers and residents in an area where the former transportation requirements were for easy access by rail and by the large and small trucks that served shipping, break-bulk, and manufacturing activities.

Changes in regional land use and economic patterns are also posing regional transportation demands that focus to some extent on the project corridor. Extensive transportation facilities are needed to transport workers from their homes to their jobs. Downtown San Francisco, being the region's largest employment center, is served by the region's most extensive transportation system. This system consists of both a highway network for automobiles and public transportation facilities. The downtown area is served by Interstate Highways 80 and 280, U.S. Highway 101, and California State Highway 480 (the Embarcadero Freeway). A number of public transportation systems serve the downtown, including BART, Caltrans Peninsula Commute Service, Muni, AC Transit, Golden Gate Transit, and SamTrans. Even with this extensive transportation system, much of the system is operating at or above capacity during commuting periods in the project corridor. Though outlying areas are expected to capture an increasing percentage of new office development, San Francisco is expected to remain the dominant office center of the region. Much of this new development is expected to occur in the Embarcadero Corridor, especially in the area south of Market Street. Consequently, the daily traffic and transit deficiencies currently observed in the Corridor will grow worse, particularly during weekday peak travel periods.

2. Freeway Withdrawal under the Transfer Concept Program

In the late 1940s elevated expressways to extend almost the entire length of San Francisco's bay waterfront were proposed. The Embarcadero Freeway was originally planned as part of the expressway waterfront route that would have connected the Bay Bridge on the east side of the City to the Golden Gate Bridge on the north. Implementation of this plan was halted, however, for a variety of reasons, including public concern about the freeway's impact on views from the City, and the economic and environmental arguments of businesses and neighborhood groups. The last portion of the freeway to be completed was finished in 1965, when the Washington and Clay Street ramps were built. Although the Embarcadero Freeway currently carries an average of 75,000 daily vehicle-trips, demolition of the freeway is under consideration and has been adopted as an official City policy.

Interstate Route 280 was originally planned to link with the Embarcadero Freeway waterfront route and the Bay Bridge. In 1974 the China Basin segment of the freeway was constructed, but the originally planned 1.4-mile connection to the Embarcadero Freeway was not built because of opposition to a waterfront freeway.

In 1973 an amendment to the Federal Highway Act, Title 23, authorized withdrawal of unconstructed segments of the Interstate System and substitution of these segments with other highway or transit projects. This amendment is the basis for developing the I-280 Transfer Concept Program. Requests for alternative projects must be submitted jointly by local and state agencies (in this case, the City and County of San Francisco and Caltrans) and concurred with by the metropolitan planning organization (the Metropolitan Transportation Commission). Substitute projects are eligible for Interstate Transfer funds. Funding levels for substitute projects are calculated using the original Interstate Cost Estimate figures for completion of the withdrawn segment, and updating the original costs based on the Federal Construction Cost Index.

On February 19, 1980 the San Francisco Board of Supervisors adopted a resolution to withdraw the originally proposed connection between I-280 and the Embarcadero Freeway from the Interstate Highway system. On December 17, 1980 the Metropolitan Transportation Commission (MTC) concurred with the resolution; and on December 18, 1980 Mayor Feinstein and Governor Brown transmitted a formal interstate withdrawal request to the U.S. Department of Transportation. A Concept Program of substitution projects was

submitted along with the withdrawal request. These actions began a process that makes about $90 million potentially available for substitute transportation projects in the corridor.

On January 16, 1981 the withdrawal request was approved by the U.S. Department of Transportation, and approval of the Transfer Concept Program (TCP) was received in May 1983.

B. PROGRAM ELEMENTS

The Transfer Concept Program is made up of several elements, which are summarized below. More detailed descriptions of these elements can be found in Chapter III. The following elements are the Concept Program substitute projects for the I-280/Bay Bridge Connection. It should be noted that the estimated cost of the entire Transfer Concept Program substitute projects listed below exceeds potentially available Interstate Transfer funds, and that the decision-making process on the implementation of the Transfer Concept Program must identify complementary funding as required, and/or identify projects to be eliminated or deferred.

Street and Highway Modifications

- I-280 Touch-Down Ramps. This element will provide a link between the elevated I-280 structure and the local San Francisco street system.

- Embarcadero Freeway. This element includes possible demolition of the elevated freeway structure from Beale Street to Broadway and possible addition of new ramp connections from the remaining portion to surface streets.

- Embarcadero Surface Road. This element involves reconstruction of the surface roadway, including associated signals, sidewalks, relocation of the Belt Line Railroad, landscaping and other features along The Embarcadero from Fourth and King Streets to Bay Street.

- Intercept Parking. The intercept parking element would provide satellite parking in the area south of Market Street which has access to freeways and is close to public transit serving the downtown and northeastern waterfront areas.

- Street and Ramp Modifications. The street and ramp modifications element involves miscellaneous Embarcadero/I-280 area street, ramp and signal modifications that would complement the freeway and roadway treatments in the Embarcadero Corridor.

- TSM Improvements. This element would provide low-cost transportation system management improvements to make existing transportation systems in the Embarcadero Corridor more efficient.

Transit Projects

- Muni Metro Extension/Peninsula Commute Service Extension. This element calls for an extension of the Muni Metro light rail service from the Embarcadero Station to the existing Southern Pacific Depot. This element has subsequently been broadened to include the extension of Caltrans Peninsula Commute Service to the downtown area as an alternate to, or in addition to, extending the Muni Metro line.

- Muni E-Line. This element would provide a streetcar or bus line along the waterfront between Fort Mason and the existing SP Depot, or between Fort Mason and an interface with the proposed F-Line in the Market Street area.

- Transbay Terminal. This project, which has been studied separately and is not an element assessed in the I-280 study, would improve and expand the existing Transbay Terminal.

- Caltrans Peninsula Commute Service Capital Improvements. This project, also not an element assessed in the I-280 study, would upgrade existing station facilities and provide some track rehabilitation.

- SFO Rail Transit Access. This project would provide preliminary engineering for improved rail transit access to the San Francisco International Airport. The project has been studied separately, and consideration in the I-280 study is limited to documenting the findings and conclusions of previous studies.

It should be noted that allocation of Interstate Transfer funds will consider all of the elements listed above including those that are not part of this study.

In January 1981, after the withdrawal request was approved by the U.S. Department of Transportation, a Policy Control Committee consisting of one representative each from the City, MTC, and Caltrans was established, and the preparation of an environmental analysis for the Transfer Concept Program was initiated.

C. PURPOSE AND NEED

1. Statement of Purpose

A primary purpose of the Transfer Concept Program will be to provide marked transportation improvements for the San Francisco Bay Area, while substantially enhancing the character of the northeastern waterfront area of the City. Satisfactory levels of mobility will be sought for the near future, as well as through the year 2000 and beyond. Current market trends, condition of existing facilities, and public support for change in the Embarcadero Corridor create significant impetus for redevelopment and renovation of the waterfront, especially in the area south of Market Street. It will be a purpose of the TCP to provide the mix of transportation projects that best meets the needs of existing and future residents, commuters, and other users of the transportation facilities in the project corridor. An important criterion of the TCP will be the extent to which it achieves the goals and objectives adopted by the Policy Control Committee (see Section II.D., Goals and Objectives).

2. Description of Need

Planning to meet future transportation needs in the project corridor must be responsive to a number of presently identified and projected needs arising out of social demands and economic development trends being experienced in the project area. Significant economic and social changes are occurring in the project corridor that will directly affect future transportation needs. The residential population in the project corridor is expected to experience a net increase from 16,000 to 43,000 persons in the next twenty years, in contrast to a decline that has endured for over two decades. Most of the population increase is projected to occur south of Market Street. The Association of Bay Area Governments (ABAG) projects a citywide employment increase of approximately 104,000 by the year 2000, of which a large percentage is expected to work within or immediately

adjacent to the project corridor. Other projected changes, again mostly south of Market Street, include the replacement of many industrial land uses with office, commercial, high density residential, and hotel uses. The high office worker and residential densities found north of Market Street and the projected increases in population densities south of Market Street reflect a substantial and increasing need for improved public transit.

The needs for transportation improvements in the project corridor are formally identified in the local, state, and federal government actions requesting and approving the Interstate Transfer Concept Program. Each of the elements assessed in this report has been derived from transportation-related studies and plans completed in recent years. The elements are all interrelated in purpose, need and function. The impacts of the alternatives and the ability of the various alternatives to meet the goals and objectives of the TCP will be considered by the decision makers along with the results of the environmental and systems review process in deciding how best to implement the I-280 Transfer Concept Program. Since the elements frame specific needs that can be addressed by the Transfer Concept Program, the following analysis is organized on an element-by-element basis. The analysis of Alternative I, the "No Project" Alternative, which assumes that none of the construction or improvement options included in the respective elements will be constructed, provides further insight into the need for action (see Chapter VIII, Evaluation of Alternatives).

a. I-280 Touch-Down

The needs that this element would serve include the provision of additional on-ramp capacity to reduce heavy p.m. peak-period street congestion and to improve bus access to I-280 , as well as improving traffic flow between I-280 and the Central Business District (CBD), the waterfront, the South of Market area, and the proposed Mission Bay development. This element would also fulfill the need to make better use of the existing unused portion of I-280 either by adding ramps, using it for parking, or demolishing it and redeveloping the land.

b. The Embarcadero Freeway

The treatments under this element include choices between controversial options -- removing the Embarcadero Freeway or retaining it essentially as constructed. Retention of the Freeway would facilitate goods access to the Embarcadero Center area and the movement of goods into and through the area north of Market Street. It would facilitate

movement of traffic to Fisherman's Wharf and the port areas north of Broadway. The existing structure also fulfills a need for storing cars that are queuing for access to the Bay Bridge during the p.m. peak period.

The option of the Freeway's removal would meet identified needs for enhancement of the northeastern waterfront areas, as well as certain transportation needs. Specifically, Freeway removal would improve the visual link between the City and the waterfront and would enhance the visual prominence of the Ferry Building and its relationship to Market Street. Freeway removal would also enhance nearby land uses, both existing and proposed, and would create new redevelopment opportunities on adjacent lands. From a transportation perspective, the incomplete facility no longer serves the original purpose, namely to provide a freeway link between the Bay Bridge and the Golden Gate Bridge, and the removal of the Freeway would facilitate other improvements on the surface roadway beneath the Freeway to provide this linkage. Removal of the Freeway could, however, result in increased congestion on surface roads.

c. The Embarcadero Surface Road

The comprehensibility of movement along the Embarcadero roadway, which is now confusing to many motorists and pedestrians, needs to be improved, and the roadway needs to be realigned and resurfaced. Intersections between The Embarcadero and other City streets need to be made more direct (90 degrees) in many places in order to improve safety and smooth traffic flow. There is also a need to enhance transit efficiency along the Embarcadero roadway and to provide increased transit accommodations to the projected residential and commercial growth in the South of Market area.

d. Muni Metro Extension/Peninsula Commute Service Extension

The Muni Metro extension would provide improved transit access along the waterfront and, depending upon the treatment chosen, would directly serve residential and office developments in the proposed South Beach, Rincon Hill and Mission Bay development areas. A Muni Metro turnback or turnaround facility included in this element is needed to increase capacity and improve reliability on existing Muni Metro lines. It would relieve current bottlenecks and delays that occur near the Embarcadero Station. A Peninsula Commute Service extension from the SP Depot at Fourth and Townsend to the Central Business District would serve a need for better transit service from the Peninsula area to the CBD employment areas.

e. Muni E-Line Streetcar

This element would also meet the need to improve the quality and speed of transit service throughout the project area. It would particularly improve service to the Fisherman's Wharf and Fort Mason areas, giving visitors and residents an option, other than cable cars, for reaching Fisherman's Wharf. It would also help meet projected transit needs between the South of Market and CBD areas.

f. Street and Ramp Modifications

These modifications would fulfill the need to improve vehicular access to and circulation within the project area. The modifications would complement the treatments for the I-280 touch-down ramps, the Embarcadero roadway and the Embarcadero Freeway. Specific street improvements in the SP Depot area are also needed to reduce conflicts between cars, pedestrians and buses.

g. Intercept Parking

Intercept parking is needed to satisfy future parking needs and to help relieve parking demand in the CBD.

h. TSM Improvements along the Northeastern Waterfront

Existing traffic congestion and the resulting difficulties in vehicle/pedestrian circulation and access along the northeastern waterfront, particularly in the Fisherman's Wharf and Pier 39 areas, call for improved intersection geometries, traffic signalization and signing, coordinated signal timing, preferential transit treatment, and other transportation systems management actions. These relatively low-cost measures are needed to improve local circulation and access by eliminating or reducing vehicle/pedestrian conflicts. They are also needed as a means of expediting traffic flow through the corridor and enhancing the waterfront's vitality as an effective regional transportation link between the Bay Bridge and Golden Gate Bridge. These measures are also needed to mitigate the traffic impact of freeway removal and complement other elements of the concept program in providing an improved total transportation system for the Embarcadero Corridor.

D. GOALS AND OBJECTIVES

The I-280 study process developed a set of goals and objectives in order to define and analyze the Transfer Concept Program alternatives. Goals and objectives were initially

prepared based on previously adopted state, regional and local government documents. The goals and objectives were reviewed by the study's Technical Advisory Committee (TAC). The results of that review, along with comments and suggestions received through public meetings and other aspects of the citizen participation and community involvement activities, were used to revise the draft goals and objectives before they were submitted to the study's Policy Control Committee (PCC) for formal review and adoption for use in the study.

It should be noted that while the words "goals" and "objectives" are sometimes used interchangeably, "goals" are defined here as general statements of what is sought to be accomplished, while "objectives" are more specific expressions of those desires. "Criteria" or "indicators" are defined as measures of performance (i.e., how well an alternative succeeds in achieving the desired goals and objectives).

The goals and objectives developed for the I-280 TCP were used in several ways. They were used to help define the TCP alternatives and identify the actions needed to aid in achieving the adopted goals and objectives. They were also used as part of the evaluation methodology. That is, each alternative was analyzed in terms of how well it would or would not achieve the goals and objectives of the Transfer Concept Program.

Table II-1 lists the goals and objectives adopted for the TCP. They are grouped into nine subject areas: transportation service, urban design and land use, environmental aspects, cost and cost effectiveness, financial feasibility, equity considerations, economic and social factors, public participation and community involvement, and institutional considerations. The goals and objectives shown are not in any particular order, and no importance should be placed on the sequence of presentation. Measures of performance for each goal and objective are listed in Appendix A.

Table II-1
I-280 TRANSFER CONCEPT PROGRAM GOALS AND OBJECTIVES

TRANSPORTATION SERVICE

GOAL: Improve Local and Regional Transportation Access through, to and within the Study Area.

Objectives:

- Minimize travel time and costs.
- Provide facilities to accommodate travel by public transportation, automobile, bicycle, foot and other modes, when and where appropriate in the study area.
- Provide facilities for the safe and efficient movement of goods and commodities.
- Maximize the attractiveness and use of public transport.
- Develop a coordinated, balanced transportation system with intermodal transfer facilities at appropriate locations.
- Maintain and enhance transit operations.
- Give priority to public transit as a means of meeting transportation needs.

URBAN DESIGN AND LAND USE

GOAL: Maintain and Enhance the Scenic, Recreational, and Cultural Values of the Waterfront and its Desirability as a Place to Live, Work and Visit.

Objectives:

- Enhance the integrity of the Embarcadero as a transition zone between land and water and as an expression of the continuity of the shoreline.
- Create a scenic waterfront boulevard (regardless of the disposition of the elevated freeway) that accommodates various modes of transportation as well as linear recreational activities such as jogging, bicycling, and walking.
- Enhance views of and public access to the Bay.
- Strengthen the viability of existing uses and maintain and enhance development opportunities in conformance with adopted policies, in particular the creation of the Rincon Point South Beach redevelopment project and Rincon Hill residential neighborhoods.

Table II-1 (continued)

- Enhance the prominence of the historic Ferry Building as a terminus to Market Street, a transportation interchange, and a gateway between land and water.
- Preserve and enhance historic, cultural, and recreational resources.
- Locate long-term parking away from the water's edge and as far inland as possible.

<u>ENVIRONMENTAL ASPECTS</u>

GOALS: **Preserve and Enhance the Environment.**

Objectives:

- Conserve land, energy (particularly petroleum-based fuels), and other nonrenewable resources.
- Minimize the need for core area automobile traffic and parking facilities by increasing vehicle occupancy and use of public transit, and by encouraging the use of peripheral parking facilities.
- Minimize or mitigate potential adverse environmental impacts of transportation facilities and services, including noise and air quality.

<u>COST AND COST-EFFECTIVENESS</u>

GOAL: **Develop a Transportation System that Is Cost-Effective and Efficient in Terms of Benefits Obtained for the Investments Required.**

Objectives:

- Make the best use of existing facilities by protecting and capitalizing on existing transportation system investments.
- Seek least-cost solutions to transportation needs, considering all aspects of direct and indirect costs.
- Seek maximum return in terms of user and community benefits from investments in transportation.
- Eliminate unnecessary duplication among transportation systems and providers of transportation services; reduce or eliminate needless excess capacity.

Table II-1 (continued)

FINANCIAL FEASIBILITY

GOAL: Develop Transportation Systems Based on a Realistic Estimate of Resources; Encourage Cost-Sharing by the Private Sector.

Objectives:

- Develop transportation plans that can be staged in a manner consistent with current and probable future capital and operation funding availability.
- Create maximum potential for private sector cost-sharing in transportation capital and operating costs in proportion to benefits received.

EQUITY CONSIDERATIONS

GOAL: Provide Transportation Services Designed to Meet the Needs of All Segments of the Population.

Objectives:

- Enhance the mobility of the transportation disadvantaged, such as elderly people and the handicapped.
- Minimize the displacement or disruption of minority, low-income, and other communities.
- Develop transportation plans that do not unfairly distribute benefits or costs among various groups.

ECONOMIC AND SOCIAL FACTORS

GOAL: Provide a Transportation System that Stimulates Social and Economic Revitalization of Existing Development in a Manner Consistent with Other Local and Regional Planning Efforts.

Objectives:

- Minimize adverse impacts on existing employment opportunities.
- Provide a transportation system that will encourage private investment and the development of commercial activities in the study area, thereby creating new jobs and contributing to the City's economic viability.
- Provide access to port facilities and water transportation for both people and goods.
- Develop a transportation system whose facilities are compatible with adjacent land uses and are consistent with and will help support planned regional development.

Table II-1 (continued)

- Provide transportation facilities that help to reinforce sense of community identity, improve linkages among interrelated activities, and provide focus for community activities.

PUBLIC PARTICIPATION AND COMMUNITY INVOLVEMENT

GOAL: **Develop Transportation Plans Giving Full Consideration to the Opinions of All Segments of the Public.**

Objectives:

- Seek the active involvement in the EIR study of local groups, the general public, agency staffs, and elected officials at the city, regional, state, and federal levels.
- Consider the opinions of visitors and others less likely to become involved in the EIR study under normal circumstances.

INSTITUTIONAL

GOAL: **Define a Set of Transportation Projects Acceptable to the City and County of San Francisco, Metropolitan Transportation Commission, and California Department of Transportation as Reflected in Their Goals and Objectives.**

III. ALTERNATIVES

INTRODUCTION

During the I-280 TCP study, eight Concept Program Alternatives were developed for detailed analysis. These alternatives represent a wide range of options concerning the transportation improvements in the I-280/Embarcadero Corridor to be substituted for the withdrawn segment of I-280 to the Embarcadero Freeway. The chart in Appendix G of this report lists all the alternatives and their treatments. This chart appears on the right half of a fold-out sheet that the reader can keep open and refer to while reading this report.

The eight alternatives were developed through a refinement process. Several alternatives were modified to include design variations or options intended to mitigate undesirable aspects of other alternatives. Alternatives II-VI are shown graphically in Figures III-2 through III-24 in Section III.B. These figures consist of plans that illustrate Alternatives II-VI and, for some alternatives, sections taken at selected points along the corridor. Locations of sections are indicated on the plans.

The alternatives described below are the basis for detailed analysis in subsequent sections of this report. Each description was prepared drawing information from the working papers developed during the TCP study. A list of these papers appears in Appendix C. In Chapters V and VI of this report the full range of impacts associated with each alternative is described in detail.

A. DEVELOPMENT OF ALTERNATIVES

Each of the designated I-280 Transfer Concept Program elements can be implemented in different ways. These different possibilities are defined as "treatments." For example, the "Embarcadero Freeway" can be treated by removing it from Beale to Broadway; or by removing it and connecting the remaining portion of the structure to the

surface streets by new ramps, either entry and exit or exit only. The left-hand column of the fold-out chart in Appendix G lists the various treatments suggested for each Concept Program element.

During the initial phase of this study, an initial "long list" of alternatives to be evaluated was compiled based on results of previous studies, suggestions from TAC members, and other sources. (Appendix B summarizes, in chart form, the initial long list of alternatives.) The long list was then reviewed with the public through meetings and workshops, including a formal "public scoping meeting" held on June 1, 1982, as well as interviews and mail questionnaires (discussed in Chapter IX. Community Involvement/Citizen Participation). As a result of this process the long list was expanded to about 30 different combinations of elements and treatments. After a thorough review of these alternatives and a review of public input received during initial screening, the study team and TAC reassembled the elements and treatments into six representative alternatives. A major consideration in defining these alternatives was to ensure that the decision makers would be provided with a range of choices highlighting trade-offs that must be evaluated. The six alternatives were subsequently approved by the PCC for subsequent study.

While most of the treatments developed early in the study process for each Concept Program element are included in one or more of the six alternatives, three are not. These treatments, and the reasons they were not considered appropriate for further study, are briefly summarized below.

- I-280 pullback to Sixth Street with no new ramps. Not studied further because it would worsen congestion at the Sixth Street on-ramp, and the urban design objectives met by this treatment can be achieved by a pullback with street connections.
- Adaptive Reuse of the Embarcadero Freeway. Not considered further due to urban design and land use considerations and due to adverse traffic, air quality, and pedestrian circulation impacts.
- Reconstruct six-lane surface roadway throughout. Dropped in favor of a more flexible design approach, providing six lanes where needed and where appropriate.

As more refined technical information about the six alternatives became available TAC proposed a number of additions and variations to the proposed treatments for further study. These proposals were subsequently evaluated by TAC members and the study team

for their proper inclusion into the alternatives. As a result, several proposals were modified, and most of the proposals were incorporated into one or more of the six original alternatives and two new alternatives (Alternatives IVA and VA) for further analysis, thus increasing the number of alternatives analyzed to eight. A few of the proposals were not included, however, because they can be more appropriately addressed as mitigation measures to the proposed treatment, or they are specific design details that should be delineated during preliminary engineering. A more detailed explanation of the reasons these proposals were modified or excluded in the analysis can be seen in separate documents which can be found in the project files.

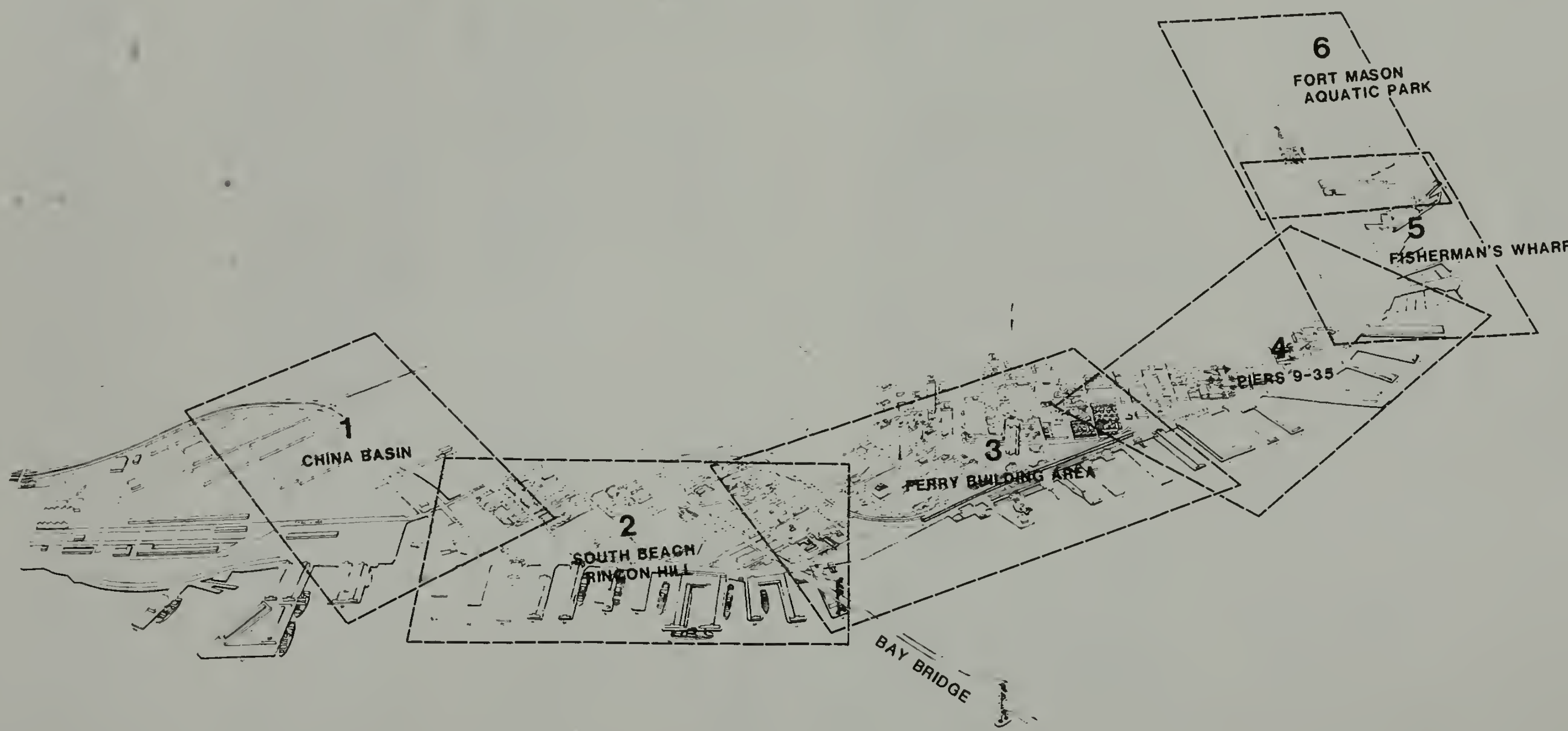
The inclusion of TAC proposed additions and variations in the eight alternatives substantially refined the proposed treatments and expanded the range of possible actions to be considered in implementing the concept represented by each alternative. It should be noted, however, that while the proposed treatments for an alternative represent the best conceptual design that can be determined within the context of this study, they do not necessarily represent "optimal" design of an alternative. Further design refinements are possible and would be investigated during preliminary engineering of the substitute projects advanced for implementation.

B. DESCRIPTION OF ALTERNATIVES

The following description of alternatives is based on detailed discussion presented in Working Papers 2.1.1, 2.2.1a, and 2.2.1b, and the study team's responses to TAC comments on these working papers, prepared during the I-280 study. The eight concept program alternatives are described below by the proposed treatment for each program element. Where appropriate for clarity of presentation, the descriptions are organized by geographic segment within the corridor, beginning with the China Basin segment at the southern end of the corridor and proceeding to the Fort Mason/Aquatic Park segment at the northern end (see Figure III-1). A set of plan and section graphics illustrates each of these alternatives, except for Alternative I. Alternative I, the No Project Alternative, receives only a general discussion here since existing conditions in the corridor are described more completely in Chapter IV.

1. Alternative I

This No Project Alternative maintains the status quo in terms of transportation facilities and services. It includes facility maintenance, transit vehicle replacement, and other



STUDY AREA SEGMENTS

NO SCALE

III-1

items required to maintain existing transit services and highway and street facilities. It also includes certain Transportation Systems Management (TSM) improvements that are either under construction, funded, or programmed for implementation in the near future. In this report the no-project alternative serves as a benchmark against which all other alternatives can be compared.

No change would be made to the existing stub-end of the I-280 Freeway at Third Street. The existing elevated Embarcadero Freeway and street connections would remain. The Embarcadero surface roadway would not be reconstructed in this alternative. Routine maintenance of the roadway would continue, but this is not part of the Transfer Concept Program. Neither the Muni Metro nor the Peninsula Commute Service rail line would be extended beyond its existing terminus. New Muni E-Line service along the waterfront would not occur. Maintenance of existing Muni service in the project area would occur, but it is not considered part of the Transfer Concept Program. This alternative would not include the proposed revisions to the Muni trolley bus routes at the Ferry Building. No I-280-related street or ramp modifications in the project area would occur under this alternative, nor would intercept parking facilities be constructed. This alternative would not include significant TSM improvements in the project area. However, the following TSM projects are included because they are either firmly committed or practically in place:

- Transit Lane on First Street
  - Establish two through traffic lanes and a transit lane on First Street between Market and Tehama Streets
  - Provide a separate right-turn-only lane at Mission Street
  - Prohibit left turns from First onto Mission Street
  - Relocate transit stop from west curb of First Street to a passenger loading island under the Transbay Terminal structure

- Along Marina, Beach, and Laguna Streets, between Doyle Drive and Bay Street:
  - Signalization along Marina Boulevard at Buchanan and Fillmore Streets
  - Signalized pedestrian crossing at Laguna Street and Marina Boulevard
  - Street widening on Laguna Street between Bay Street and Marina Boulevard

- Peak period signal progression

- Additional informational signs (City's signing plan)

- Along Bay Street, between Laguna and the Embarcadero roadway:

  - Improve intersection at Laguna to provide double right-turn lanes from Bay (FAU 83 project)

  - Signalization at Kearny Street

  - Signal timing improvements along Bay Street

  - Additional informational signs on North Point, Bay Street, and Van Ness Avenue in the eastbound and northbound directions (City's signing plan)

- Signal coordination for Golden Gate Transit buses on Van Ness at North Point, Bay, and Lombard

In addition to the above TSM projects there could be other TSM improvements resulting from independent ongoing studies in the project area (e.g., the Ferry Building renovation project and the Fisherman's Wharf area access study). The recommendations from these independent studies are not considered part of the Concept Program.

2. Alternative II

This alternative is intended to be the next step beyond the minimal investment No Project Alternative. It involves only those changes necessary to ease the most crucial transportation problems within the corridor (see Figure III-2). Alternative II includes adding an I-280 entry ramp between Third and Fourth Streets; maintaining the existing Embarcadero Freeway; reconstructing a four-lane Embarcadero surface roadway and improving auto, pedestrian, and bicycle movement beneath the freeway; providing a Muni Metro turnback facility at Embarcadero Station; improving Embarcadero bus service from Fort Mason to the SP Depot; providing street and ramp modifications and Intercept Parking in the project area; and implementing certain already-programmed TSM improvements along the Northeastern Waterfront. If the fold-out chart in Appendix G, page A-67 is kept open, the reader can see which treatments (marked by the symbol 'o') are included in each alternative. Specific treatments for each of the major elements of this alternative are described as follows:

a. I-280 Touch-Down

A two-lane entry ramp to the I-280 Freeway would be constructed between Third and Fourth Streets. The new on-ramp would extend from the Third and King Street intersection at a 4.4% grade to the existing westbound deck of the freeway originally intended for a ramp connection with Fourth Street. The proposed alignment would require partial removal of an existing warehouse and acquisition of additional right-of-way. The existing I-280 structure and off-ramp to Fourth Street would remain. The off-ramp approach to Fourth Street would be modified to provide passage of a third lane from the off-ramp into Berry Street. This proposed modification would require right-of-way acquisition in rounding of the southeast corner of Fourth and Berry Streets.

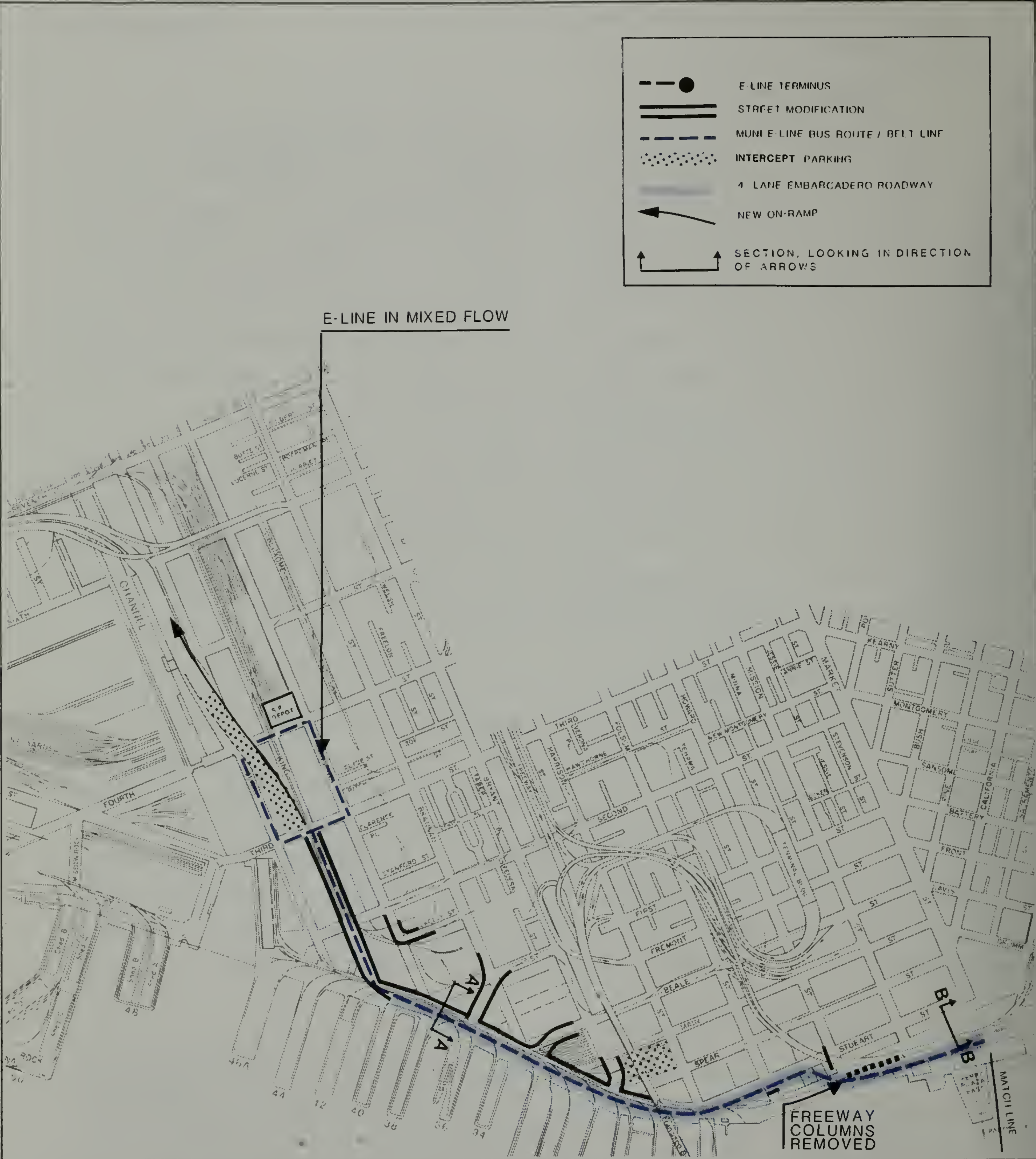
The stub-end of the freeway would be used for approximately 700 commuter parking spaces with a possible 300 additional spaces to be provided under the freeway structure. A barrier would prevent direct access to the parking deck from the freeway and would block the sight of autos and headlights in the parking area from cars on the freeway. Separate parking access ramps would be provided.

b. Embarcadero Freeway

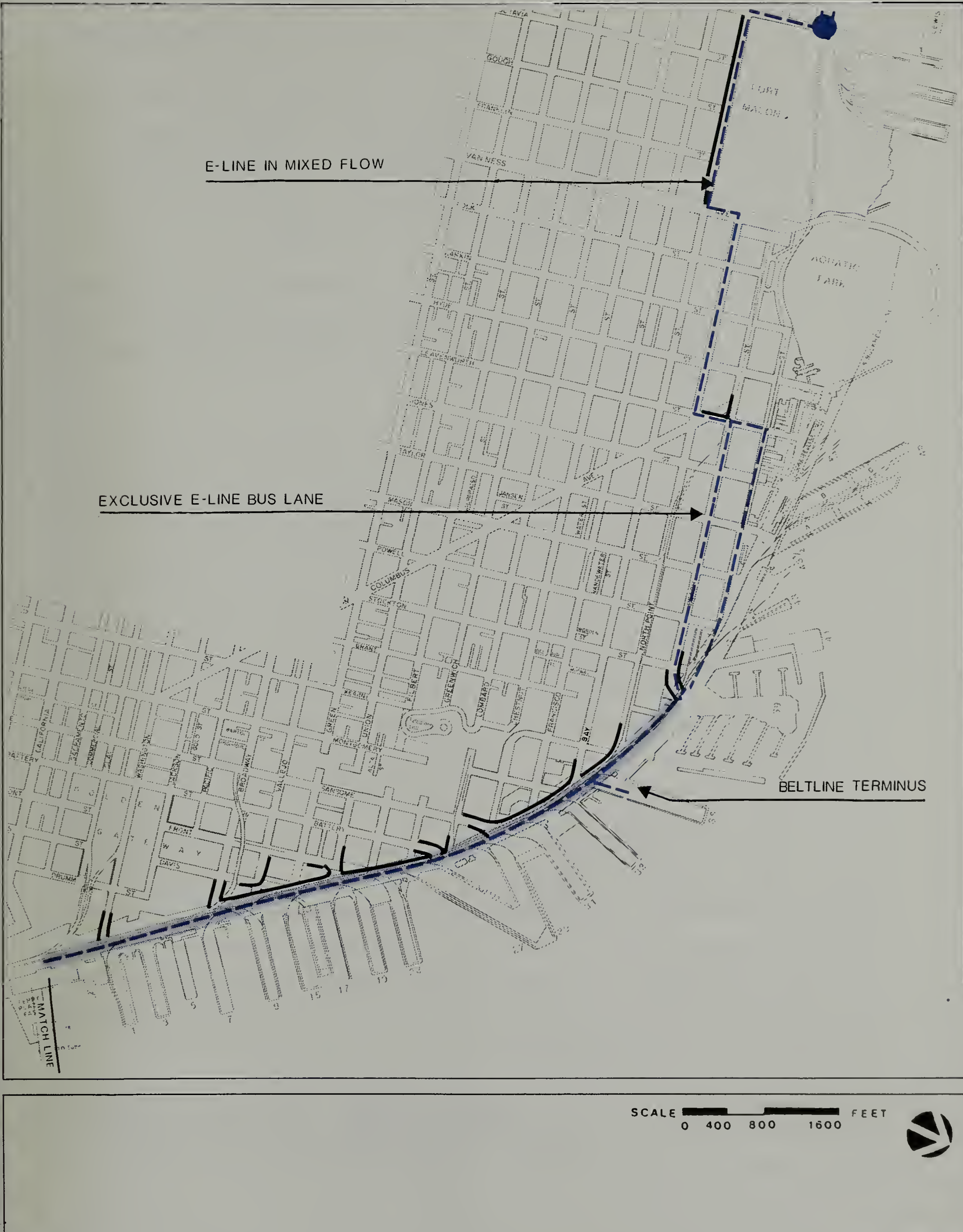
The Embarcadero Freeway and ramp connections would remain essentially "as is." However, the addition of low-cost features, such as landscaping associated with Embarcadero surface roadway improvements, would improve its appearance. To eliminate conflicts with the northbound lanes of the proposed Embarcadero surface roadway alignment, six easterly columns of the Embarcadero Freeway near Howard Street would have to be removed and the affected portions of the freeway structure reconstructed. Alternatively, the roadway could be aligned to miss the freeway structure, but this would encroach on Ferry Building rights-of-way and the Embarcadero promenade.

c. Embarcadero Surface Roadway

The Embarcadero surface roadway would be reconstructed to four lanes between Bay and King Streets and connected to the new I-280 on-ramp via a reconstructed King Street. Although only the segment between Fourth Street and Broadway is a substitute project within the Concept Program, the segment north of Broadway will be reconstructed with the same design configuration. Therefore, in order to complete the technical analysis for the I-280 study, concept designs were developed for the entire length from Fourth and



ALTERNATIVE II


E-LINE IN MIXED FLOW
EXCLUSIVE E-LINE BUS LANE
BELTLINE TERMINUS
MATCH LINE
SCALE
0 400 800 1600
FEET

III–2

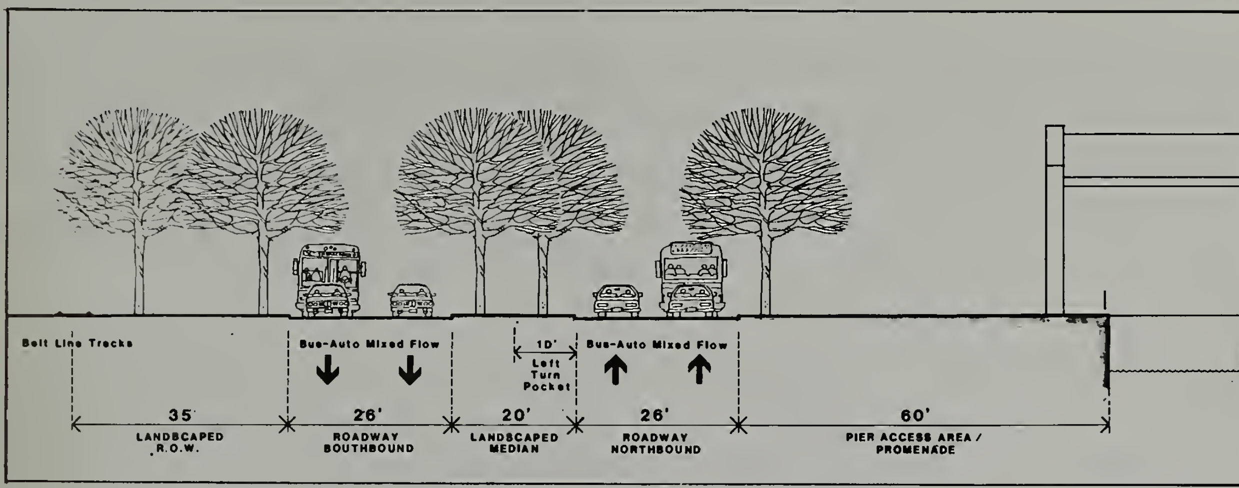
King Streets to Bay Street, specifying street alignments, required right-of-way widths, number and direction of lanes, location of turn lanes, and other associated street improvements. Detailed drawings of the Embarcadero surface roadway improvements for each alternative are available in Technical Working Papers 2.1.1 and 2.2.1a & b. Major features of the roadway improvement proposed in this alternative are summarized below.

In the China Basin segment, King Street would be reconstructed between Third and Second Streets with three westbound lanes and two eastbound lanes. Two of the westbound lanes would connect directly to the I-280 on-ramp; the two eastbound lanes would connect to the I-280 off-ramp via Third and Berry Streets.

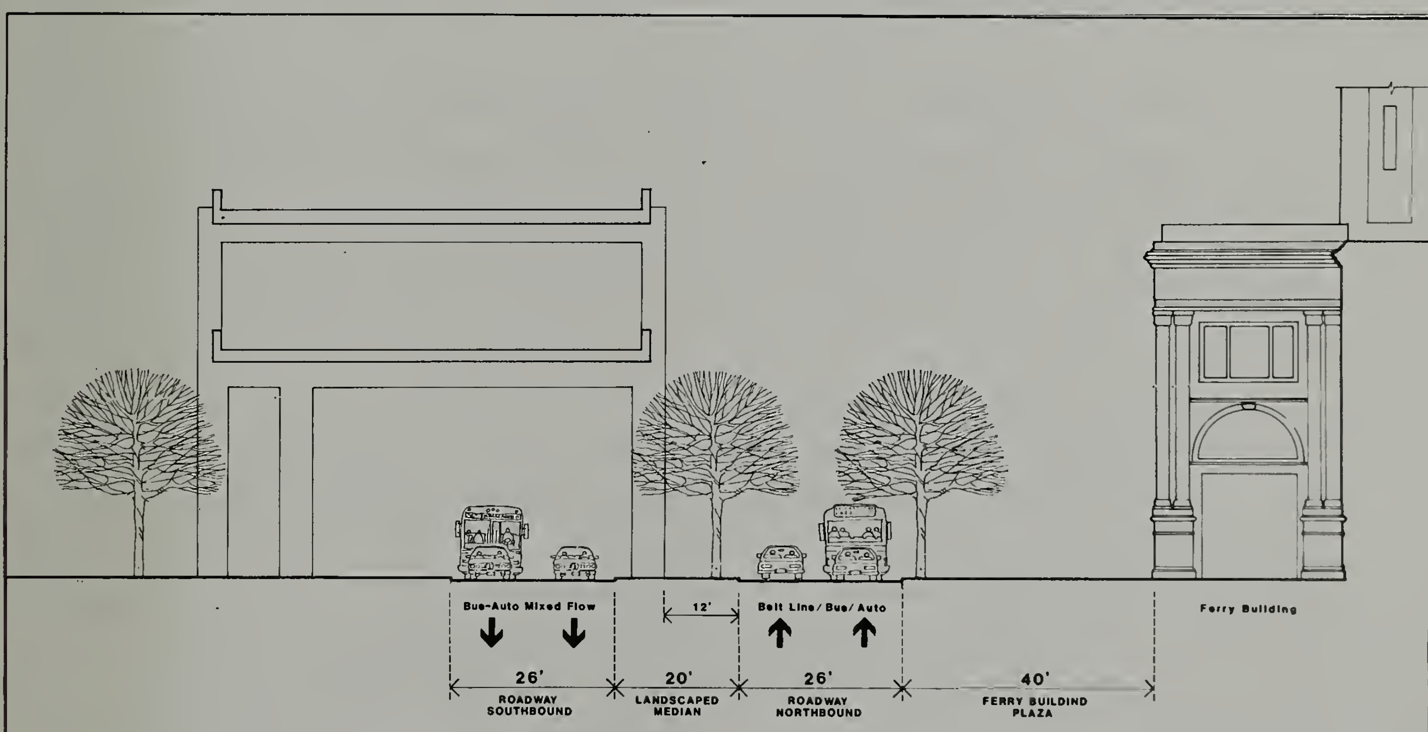
In the South Beach/Rincon Hill segment the Embarcadero roadway would have two lanes in each direction, with a 20-foot landscaped median in the center creating a 72-foot right-of-way (see Figures III-2 and III-3). A 60-foot setback from the waterfront line would provide a right-of-way for pier access and for recreational improvements. A left-turn lane at Second Street would allow westbound traffic to turn into the proposed South Beach Park and marina. Portions of Townsend and First Streets would be closed to through traffic, and the intersections at Beale and Bryant Streets would be modified to provide 90 degree intersections with the Embarcadero roadway. Brannan Street between First Street and the Embarcadero roadway would be realigned to intersect the Embarcadero roadway at 90 degrees. The realignment of Brannan Street would split an existing triangular parcel owned by the Redevelopment Agency. Along the Embarcadero roadway turn lanes would be provided at Brannan, Beale, Bryant, and Harrison Streets.

Through the Ferry Building area, the roadway would continue along the alignment proposed in the Northeast Waterfront Plan along Steuart Street to Folsom (see Figure III-2). From Folsom, the roadway would curve northward toward the waterfront, defining the proposed waterfront park adjacent to the recently completed promenade. The present Steuart Street right-of-way between Howard and Folsom Streets would be closed to through traffic. A left-turn lane would provide access for northbound Embarcadero traffic onto Howard Street.

The Embarcadero roadway between Howard Street and Broadway would run adjacent to and beneath the existing Embarcadero Freeway structure. The two northbound lanes would lie east of the freeway structure, southbound lanes would lie beneath it, and



A. Embarcadero Roadway, near Pier 38, Looking North



B. Embarcadero Roadway at the Ferry Building, Looking North

ALTERNATIVE II: SECTIONS

(See Figure III-2 for specific locations)

SCALE 0 5 10 30 FEET

III-3

columns would fall in the median. The Embarcadero roadway would have median turn pockets at Mission, Washington, and Broadway. A left turn pocket for southbound traffic at Mission Street would permit U-turns and access to the Ferry Building site. Broadway and Washington Street approaches to the Embarcadero roadway would be modified to provide 90 degree intersections.

Between Piers 9 and 35, access to the Embarcadero roadway would be at Union, Battery, Lombard, Sansome, Bay, and North Point Streets. Separate turn lanes along the roadway would be provided at Union, Lombard, Bay and North Point Streets. Present access to the Embarcadero roadway from Vallejo, Chestnut, and Kearny Streets would be closed. Chestnut Street between Montgomery and Sansome Streets would be open to local access only. Modification of the present intersections at Battery and Sansome would create more perpendicular connections. Between Piers 9 and 31, the roadway would be set back approximately 60 feet from the bulkhead line to provide pier access and recreational improvements along the waterfront.

In the Fisherman's Wharf area, the Embarcadero roadway would connect to the existing four-lane roadway that presently connects to Jefferson Street and Fisherman's Wharf. Beach Street between Grant and Stockton would be realigned to provide a 90-degree intersection with the Embarcadero roadway. The south sidewalk of Bay Street between Van Ness Avenue and Laguna Street would be narrowed for bus operation along Bay Street.

The Belt Line, a Port-operated railway system serving the piers, would follow its present alignment through the China Basin segment in the King Street roadway. Along the South Beach/Rincon Hill segment, the Belt Line would continue along the existing tracks west of and parallel to the proposed roadway. At Harrison Street, the Belt Line would cross the Embarcadero roadway along its present alignment to the northbound lanes of the new roadway; at Broadway it would transition into the median where it would proceed along its present alignment as far as its present terminus at Pier 35. All currently active Belt Line access to piers would be maintained or restored.

d. Muni Metro/Peninsula Commute Service Extension

This alternative would not extend the Muni Metro line from Embarcadero Station to the existing SP Depot at Fourth and Townsend, nor would it include an extension of the

Peninsula Commute Service to downtown. It would include, however, a Muni Metro underground turnback facility at the Embarcadero Station (see Figure III-5). The turnback would have the flexibility to be expanded into a loop turnaround facility at a later date as a separate project.[1]

e. **Muni E-Line**

In this alternative, an upgraded new bus service along the Embarcadero roadway is proposed in lieu of a rail transit service. The new E-Line bus route would run from Fort Mason to the existing SP Depot at Fourth and Townsend and could utilize modern buses, double-deckers, or vintage buses.

Between the SP Depot and Bay Street, buses would share the roadway with vehicular traffic in both directions. North of Bay Street, one of the northbound lanes could be converted into an exclusive bus lane to Jefferson Street, and one of the southbound lanes could be converted into an exclusive bus lane from Beach Street. Between the Embarcadero roadway and Leavenworth, an exclusive bus lane would be provided on Jefferson Street for westbound buses and on Beach Street for eastbound buses. Parking would be prohibited on the north side of Jefferson Street between Leavenworth and the Embarcadero roadway, on the south side of Beach Street between Leavenworth and Powell, and on both sides of Beach Street between Powell and the Embarcadero roadway. These changes would accommodate the exclusive bus lane without reducing the existing traffic lanes on these streets. From Leavenworth, buses would share the roadway with vehicular traffic via North Point, Van Ness, Bay, Laguna, and Beach Streets to a terminus at Fort Mason. The south sidewalk of Bay Street between Van Ness Avenue and Laguna Street would be narrowed for bus operation along Bay Street.

Bus turnaround and layover would be provided at Fort Mason. The existing Muni trolley/bus terminal at Mission and Steuart could be used for temporary storage or as a turnaround for truncated trips.

Weekday service would be from 6 a.m. to midnight, with a 4-minute headway during a.m. and p.m. peak periods, 10-minute headway during base period, and 15-minute headway in the evening. (Peak periods are defined as 7-9 a.m. and 4-6 p.m.; weekday base periods, outside of the peak, are defined as 6-7 a.m and 9 a.m. - 4 p.m; and the evening period is 6 p.m. - 12 midnight.) Initially, 50% of the peak-period trips would be between the Ferry

Depot only, and half of the evening period trips would be between the Ferry Building and Fort Mason only. The percentage of through trips could be increased when required by demand at north of Ferry Building. On weekends, there would be a 10-minute headway, and half of the evening period trips would be between Fort Mason and the Ferry Building only.

As an alternative to exclusive bus lanes on Jefferson and Beach Streets, the proposed E-Line bus route could be operated two-way on Jefferson Street between Leavenworth Street and the Embarcadero roadway. Jefferson Street would be reconstructed to transit mall standards with extended sidewalks and two bus lanes (one in each direction) in the center of the mall. The mall bus lanes would connect with the exclusive bus lanes on the Embarcadero roadway to Bay Street. Jefferson Street would be open for local access only, except for the block between Leavenworth and Jones Streets where an eastbound auto lane would be provided to facilitate vehicle circulation and access to the Fisherman's Wharf area. From Jefferson Street, E-Line buses would follow the same route to Fort Mason as described above.

f. Street and Ramp Modifications

The following street and ramp modifications are proposed to complement the reconstructed Embarcadero roadway and improve vehicular access to the study area:

- Third Street would be made one-way from Fouth to Berry Streets, and Fourth Street would be made one-way from Third to Brannan Streets.
- The existing I-280 off-ramp at Fourth Street would be modified to provide three through lanes at the exit ramp while maintaining the existing right-turn lane.
- Berry Street between Third and Fourth Streets would be striped for four lanes eastbound.
- The Third Street/King Street intersection would be modified to provide five approach lanes on Third Street with seven possible movements at the intersection.
- King Street would be made one-way westbound between Third and Fourth Streets to provide direct access to the proposed I-280 on-ramp.
- Between Third Street and the reconstructed Embarcadero roadway King Street would be reconstructed to provide access to and from the I-280 on/off-ramps.
- Second Street would be developed with a reversible median transit lane for SamTrans buses to access the Transbay Terminal.

- Sidewalk would be narrowed on the south side of Bay Street between Van Ness Avenue and Laguna Street for bus operation on Bay Street.

- Columbus Avenue would be closed between Leavenworth and Beach to reduce traffic conflicts.

- As an alternative to exclusive bus lanes on Jefferson and Beach Streets, Jefferson Street would be reconstructed to transit mall standards between Leavenworth and The Embarcadero for two-way bus operation.

g. Intercept Parking

This alternative includes the development of an intercept parking facility beneath the Bay Bridge in an area bounded by Harrison, Main, Bryant, and Beale Streets. In addition, the area directly under the existing I-280 stub-end at Third Street and/or the freeway deck itself could be developed as potential intercept parking sites.

h. TSM Improvement along the Northern Waterfront

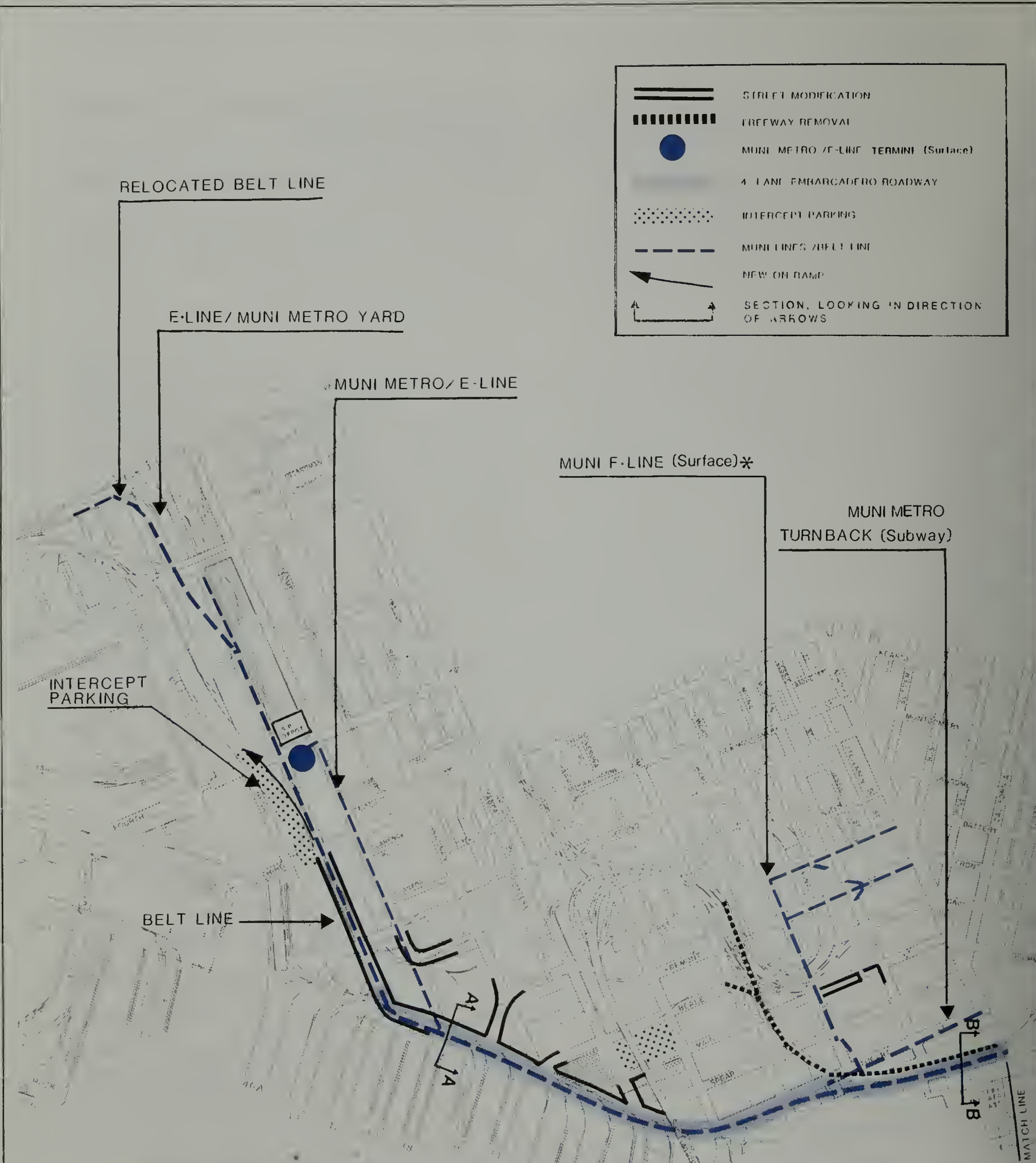
Alternative II does not propose significant investment in TSM improvements beyond those associated with the Embarcadero roadway reconstruction (such as the relocation and modification of existing signals along the Embarcadero roadway), the Muni E-Line, and street and ramp modifications described above, but it would include the measures already committed as described for the No Project Alternative.

3. Alternative III

This alternative is intended basically to reflect the City of San Francisco's policies in 1980 concerning transportation improvements in the I-280/Embarcadero Corridor. It features removal of the Embarcadero Freeway without any new ramps; addition of an entry ramp to I-280 and removal of a portion of the freeway structure; the Embarcadero surface road reconstruction to four lanes throughout; Muni Metro extension to the SP Depot and an undeground turnback at Embarcadero Station; Muni E-Line streetcar service along the Embarcadero roadway; street and ramp modifications and intercept parking, implementing already-programmed TSM improvements along the Northeastern Waterfront (see Figures III-4 and III-5).

a. I-280 Touch-Down

The I-280 Freeway structure would be removed from the existing end at Third Street to the west side of Fourth Street. As with Alternative II, a new on-ramp would be



ALTERNATIVE III

(See Figure III-5 for enlargement of Ferry Building Segment)

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

EXCLUSIVE E· LINE
SHARED E·LINE /BUS LANE
MUNI E·LINE &BELT LINE
BELTLINE TERMINUS
FORT MASON
AQUATIC PARK
MATCH LINE
SCALE FEET
0 400 800 1600
III-4
ALTERNATIVE III

constructed from the Third and King Street intersection to the existing freeway structure, requiring partial removal of a warehouse and acquisition of additional right-of-way. Commercial development or parking for approximately 450 vehicles would be possible in the area of freeway removal. The off-ramp to Fourth Street would remain, but the exit would be modified for the passage of a third lane to Berry Street, requiring additional right-of-way at the southeast corner of Fourth and Berry Streets. Also, as an option, Berry Street could be realigned east of Third Street to join King Street at Second Street for direct connection between the off-ramp and the Embarcadero surface roadway (see Figure III-6).

b. Embarcadero Freeway

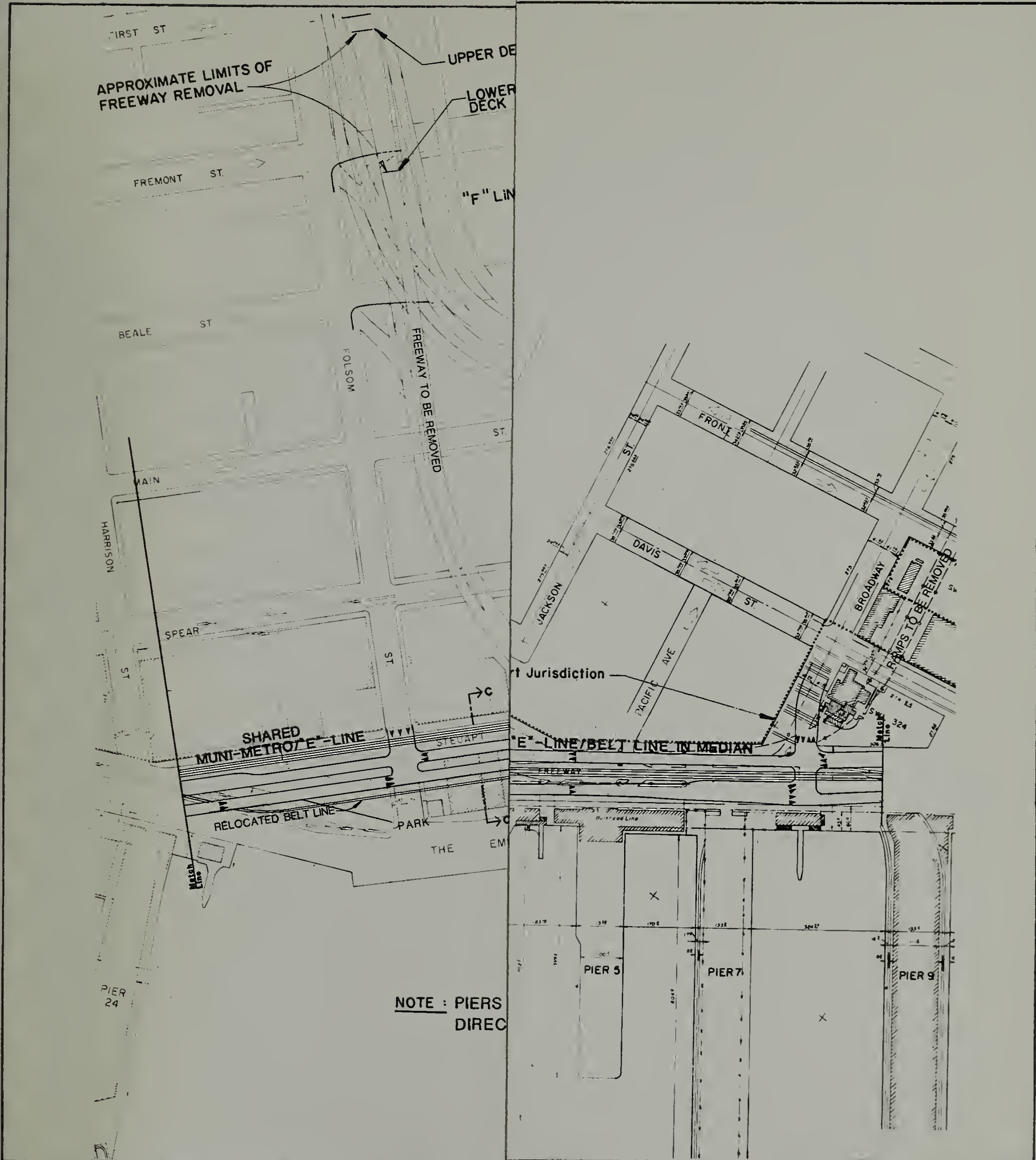
The existing freeway structure would be removed from Broadway to First Street along the upper deck and from Broadway to Fremont Street along the lower deck. Ramp connections to Fremont Street, Washington, Beale/Folsom and Clay Streets, and Broadway would also be removed. Existing connections at Beale and Main Streets would remain (Figure III-5).

c. Embarcadero Surface Roadway

The Embarcadero surface roadway would be reconstructed to four lanes and is described in detail in Working Papers 2.1.1 and 2.2.1a. Major features of the proposed roadway are summarized below.

In the China Basin and South Beach/Rincon Hill segments the road configuration and traffic system would be the same as Alternative II, with the exception of the area surrounding the SP Depot. Fourth Street would be widened for a Muni Station on the east side of the street and a bus stop in front of the Depot, separated from the roadway by an island. Also, Berry Street could be extended across Third Street and realigned to join King Street and Second Street for more direct connection between the I-280 off-ramp and the Embarcadero surface road. As in Alternative II, Townsend and First Streets would be closed, Brannan, Beale, and Bryant Streets would be realigned, and a 60-foot setback from the waterfront would be provided.

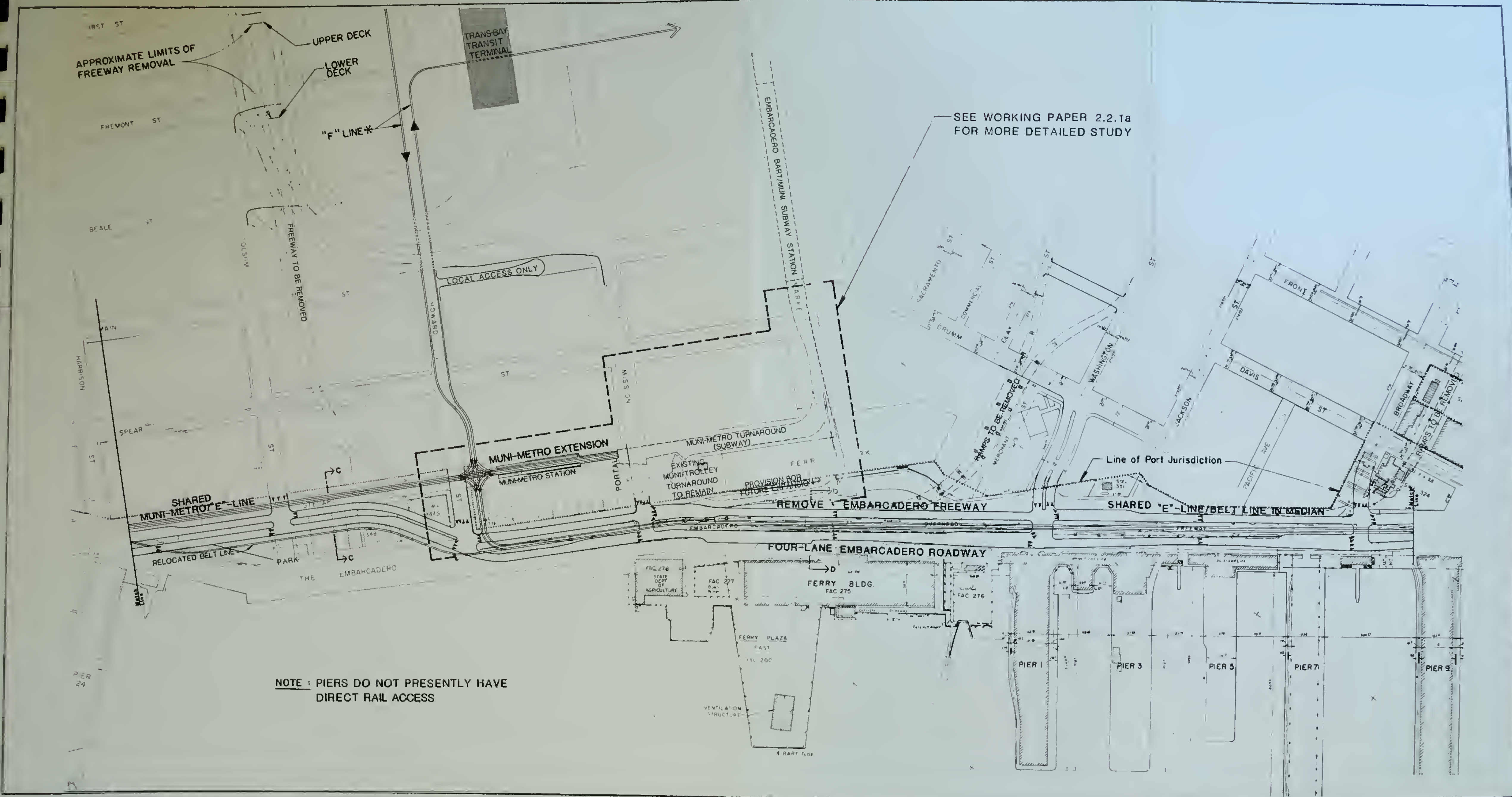
In the Ferry Building area the roadway would follow the same alignment proposed in Alternative II along Steuart Street to Folsom Street, curving back to the waterfront between Folsom Street and Howard Street. Steuart Street would be closed between



ALTERNATIVE III: ENLA

SCALE 0 200 400 600 FEET

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP S

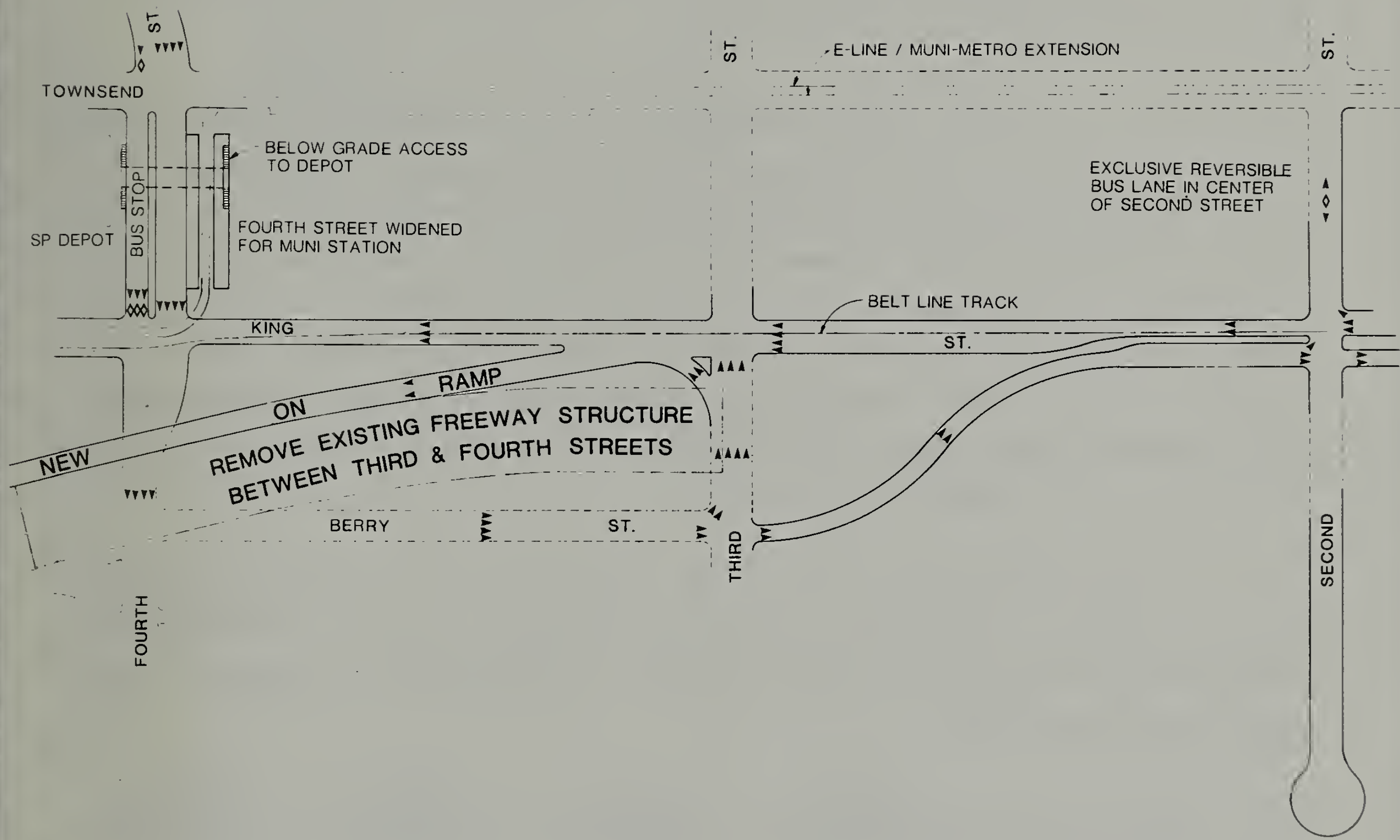


ALTERNATIVE III: ENLARGEMENT OF FERRY BUILDING SEGMENT

SCALE 0 200 400 600 FEET

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

III-5



ALTERNATIVE III: I-280 ON RAMP DESIGN OPTION

III-6

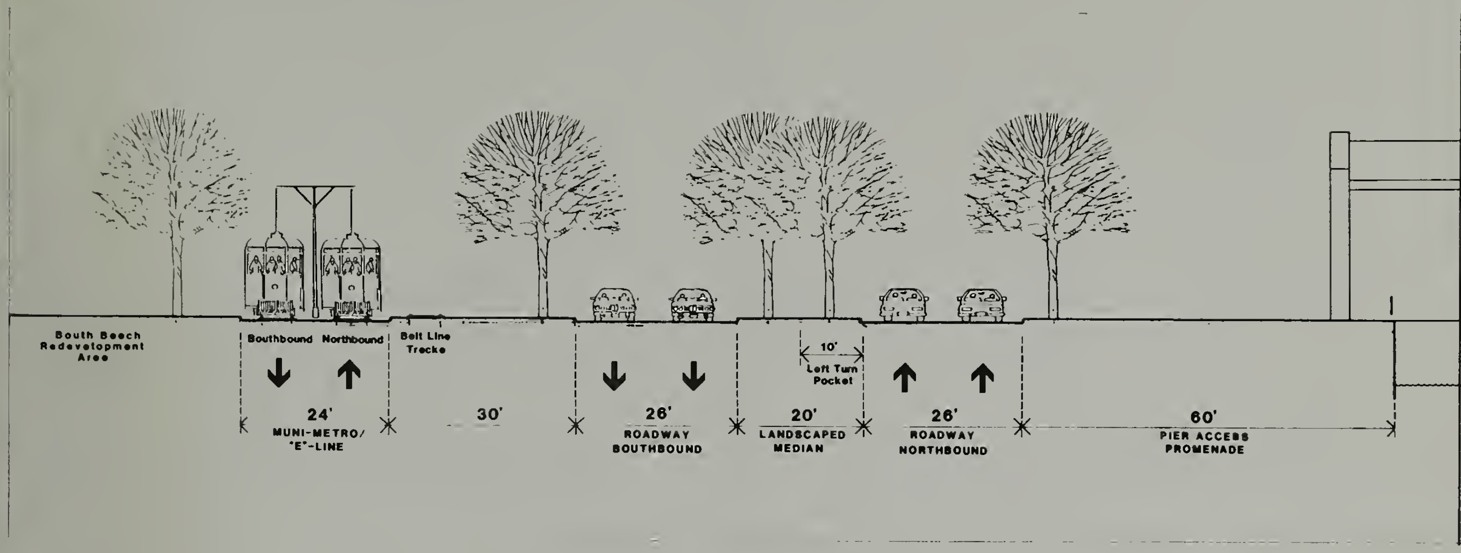
Howard and Folsom Streets. North of Howard Street the roadway right-of-way would widen to 102 feet, including an E-Line right-of-way in the landscaped median (see Figure III-7). Turn lanes would be located on the Embarcadero roadway at Howard Street, Mission Street, Washington Street, and Broadway, with U-turns for the Ferry Building complex access permitted at Mission Street. A 400-foot-long drop off/parking bay is proposed in front of the Ferry Building complex.

In the Piers 9 - 35 segment, median landscaping would be removed and the Embarcadero roadway would narrow to a 76-foot right-of-way north of Bay Street. Nevertheless, 10 to 15 feet along the sidewalk of the Pier 39 complex, 10 feet of Seawall Lot 314 (presently containing a gas station and car wash) and a small portion of sidewalk at Grant Avenue would be taken for the roadway. The roadway would be set back from the bulkhead line between 35 and 45 feet in order to provide pier access and recreational improvements along the waterfront. Turn lanes would be located at Union, Lombard, and Bay Streets. Street closures proposed under this alternative would be exactly the same as those in Alternative II, with the addition of North Point.

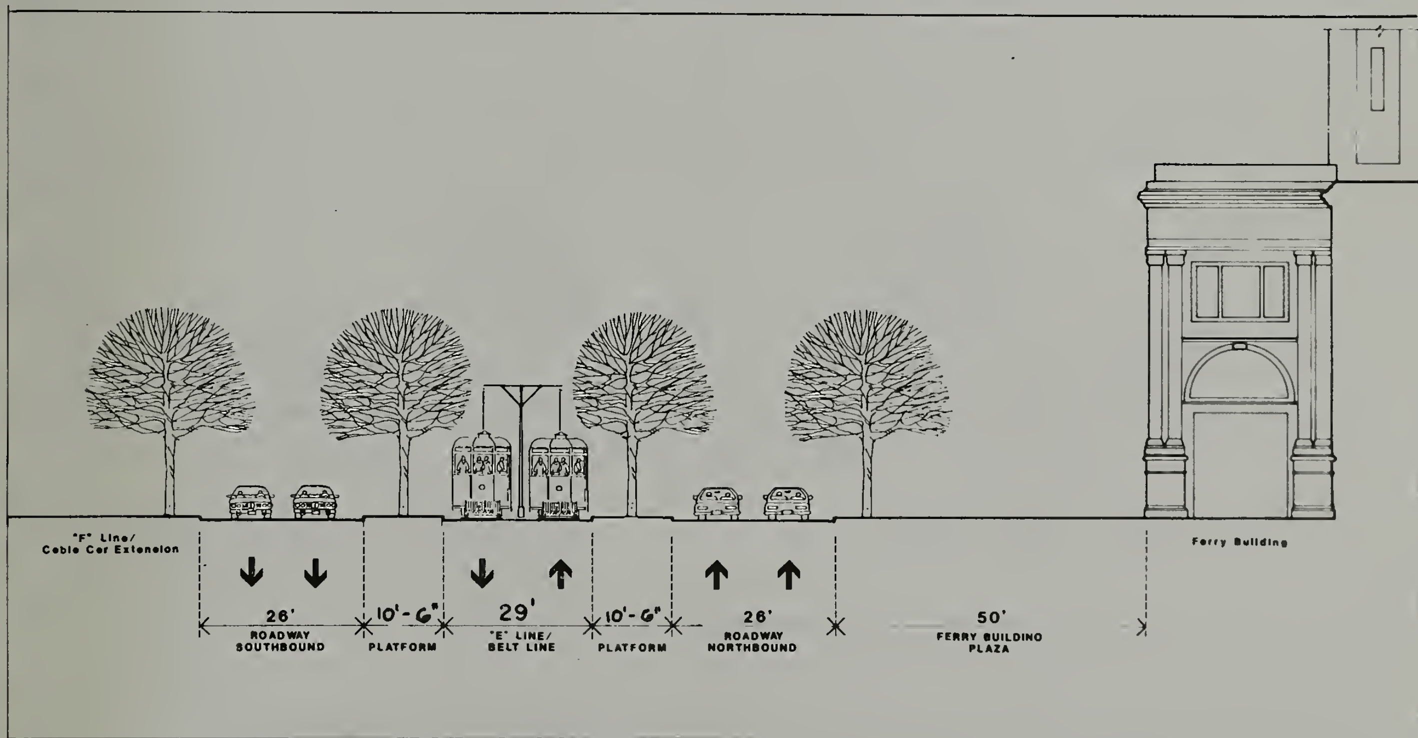
In the Fisherman's Wharf segment the roadway would narrow to the present cross section. As in Alternative II, Beach Street would be redesigned to provide a perpendicular connection. Jefferson Street would be modified to accommodate an exclusive E-Line right-of-way (Figure III-8).

In the Aquatic Park segment Hyde Street would be open for local access only between Jefferson and Beach Streets.

The Belt Line railroad would parallel the proposed Muni Metro/E-Line tracks in the China Basin segment to Fourth Street and then connect to the existing King Street tracks. In the South Beach/Rincon Hill segment, the Belt Line would follow existing tracks across and parallel to the Embarcadero roadway. At Harrison Street, the Belt Line tracks would cross the roadway into the proposed park and then parallel to the roadway. At Howard Street, the Belt Line would cross the roadway again and connect to the muni E-Line tracks in the median of the roadway as far as Pier 35, where it presently terminates. All currently active Belt-Line access to piers would be maintained or restored.



A. Embarcadero Roadway near Pier 38, Looking North



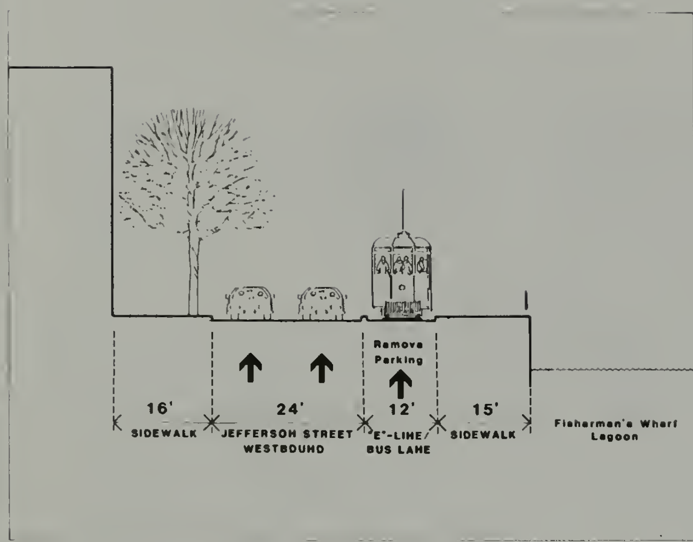
B. Embarcadero Roadway, at Ferry Building

ALTERNATIVE III: SECTIONS

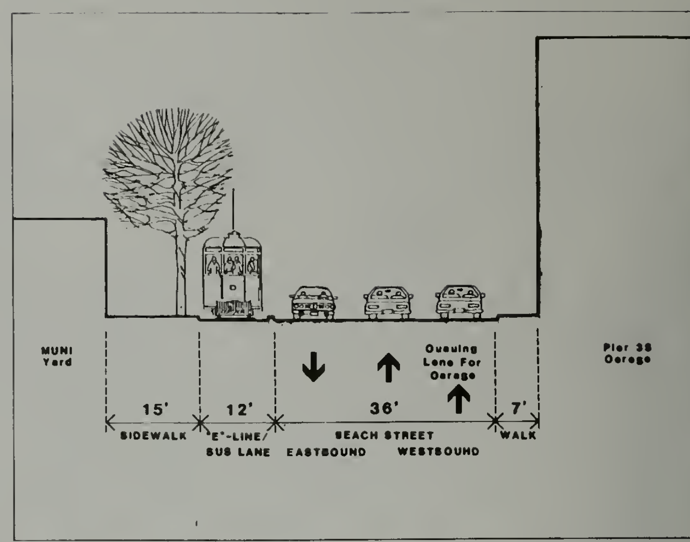
(See Figure III-4 for specific locations)

SCALE FEET 0 5 10 30

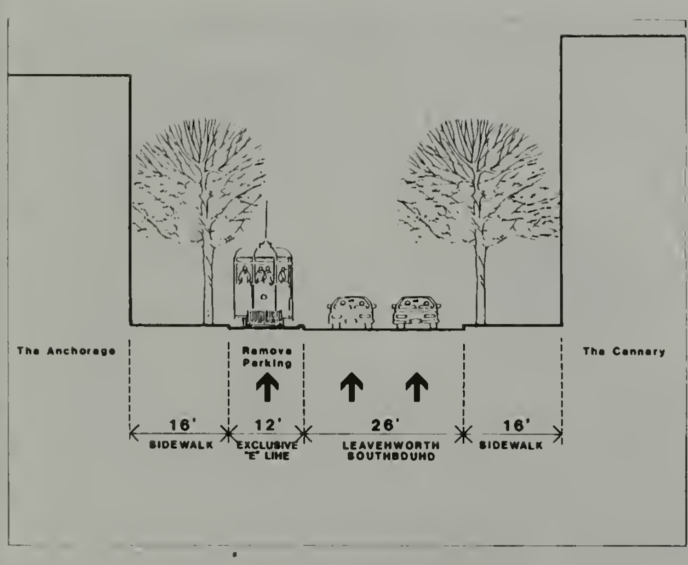
III-7



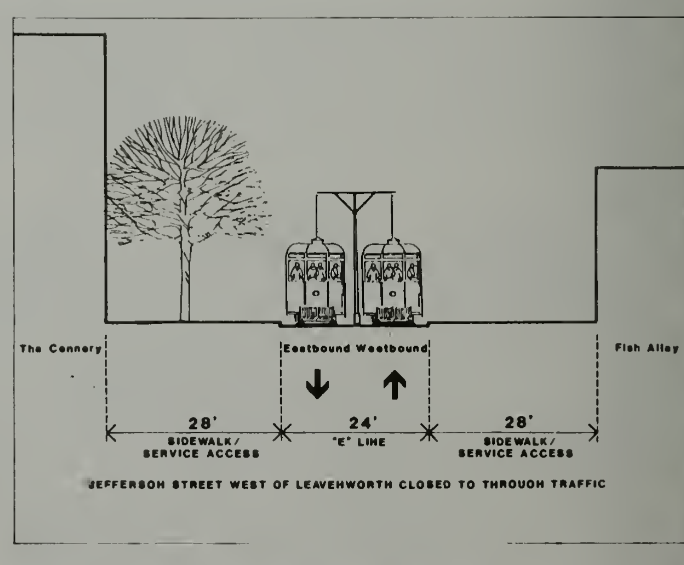
C. Jefferson Street near Fisherman's Wharf, Looking West



D. Beach Street near Powell, Looking West



E. Leavenworth Street near Beach, Looking South



F. Jefferson Street near Hyde, Looking West

ALTERNATIVE III: SECTIONS

(See Figure III-4 for specific locations)

SCALE FEET 0 5 10 30

III-8

d. **Muni Metro/Peninsula Commute Service Extension**

This alternative proposes to extend the Muni Metro line from the Embarcadero Station to the SP Depot at Fourth and Townsend. The Peninsula Commute Service would not be extended beyond the existing depot.

A car storage yard and maintenance facility for the Muni Metro extension would be located west of the SP Depot between King and Berry Streets west of Sixth Street. Later extension of the Muni Metro service to the south would be possible.

A two-track Muni Metro surface line would follow King Street to Fourth Street, which would have a station stop with side platforms opposite the existing SP Depot. The line would then follow Townsend Street to the west side of the four-lane Embarcadero roadway with a station at Townsend and the Embarcadero roadway. From Harrison, Muni Metro would continue in Steuart Street to a "grand union" intersection on the north side of Howard Street. From this location a proposed F-Line would extend westward, the E-Line would extend eastward, and Muni Metro would continue northward into a subway just south of Mission Street. A station with side platforms in this segment would allow transfers between Muni Metro, the F-Line, and the E-Line. From Mission Street the subway line would continue to a proposed underground Muni turnback at the east end of the Embarcadero Station.

Presently, it is assumed that train headways would be at 4 minutes during peak periods, 8 minutes during base periods, and 12 minutes during evening periods on weekdays. Weekend service would be at the weekday base and evening service levels. Service frequency during peak periods would be adjusted to balance with demand.

e. **Muni E-Line**

This alternative proposes a Muni E-Line rail service along the Embarcadero roadway from Fort Mason to the SP Depot. South of the grand union intersection (a four-way rail intersection) north of Howard Street the E-Line would share tracks, stations, and yard facilities with the Muni Metro extension. North of this intersection, the E-Line would continue in an exclusive right-of-way shared with the Belt Line to the 50-foot transit median of the Embarcadero roadway to Beach Street. Between Howard Street and Pier 35, the E-Line would share tracks with the Belt Line railroad in the roadway median.

From Beach Street only the westbound track would be in the median of the Embarcadero roadway, turning onto an exclusive transit right-of-way along Jefferson Street to Hyde. This transit right-of-way would require removing existing parking along Jefferson Street and utilizing the existing tracks. The eastbound track would have an exclusive transit right-of-way along Beach between Leavenworth and the Embarcadero roadway. West of Leavenworth both tracks would continue on Jefferson Street and merge into the single existing track through Aquatic Park. This track presently follows the curve of the beach in front of the Maritime Museum and crosses Van Ness Avenue into an existing tunnel to Fort Mason. A terminus and turnaround loop would be located south of the tunnel's west portal, east of Laguna Street. Between the grand union intersection and Fort Mason, stations would be located at the Ferry Building, Broadway, and Lombard, Beach, Taylor and Hyde Streets.

In Alternatives III-VI, the E-Line would have a right-of-way width of 24 feet along double-track segments, 12 feet along single track segments, and 29 feet where it shares tracks with the Belt Line railroad. It should be noted, however, Muni recommends a 29-foot right-of-way for center-pole configuration and 28 feet for side-pole configuration, for double-track operation. If in the course of preliminary engineering and final design the Muni recommended right-of-way widths are adopted, modifications in the proposed design for these alternatives would be required.

Service initially would be from 6 a.m. to midnight, with 7.5-minute headway during peak periods and 10-minute headway during base and evening periods on weekdays and weekends. Peak period service frequency would be adjusted according to demand and coordinated with Muni Metro and F-Line frequencies. Vehicles for the E-Line rail service could be vintage streetcars, Metro-type LRVs, or existing PCC cars (the type of streetcars used by Muni on the Market Street system). However, the use of PCC cars would require side platforms at stations and a loop or a "Y" for turnaround. Should center platforms or a "stub-end" turnaround be selected because of right-of-way constraints, modification in existing PCC (i.e., capability to load and unload passengers from either side of the car) and, possibly, vintage streetcars would be required.

f. Street and Ramp Modifications

Some street and ramp modifications proposed for this alternative were discussed under Alternative II, including making Third and Fourth Streets one-way; modifying the existing

I-280 Fourth Street off-ramp, providing four eastbound lanes on Berry Street; providing a median transit lane on Second Street; and closing Columbus Avenue from Leavenworth to Beach.

Alternative III includes the following additional street and ramp modifications:

- Fourth Street between Berry and Townsend Streets would be reconstructed to provide a Muni station on the east side and a bus stop in front of the SP Depot, separated from four southbound traffic lanes by a median.

- The Third/King intersection, due to removal of I-280 between Third and Fourth, would be configured somewhat differently than in Alternative II. In this Alternative the I-280 on-ramp would form a fifth leg at the intersection (see Figure III-6).

- King Street, east of Third Street, would have two eastbound and two westbound travel lanes and would connect directly to the reconstructed Embarcadero roadway.

- Widening the Embarcadero Freeway/Main Street exit ramp would increase capacity at the ramp's intersection with Mission Street and improve local circulation. Main Street would be closed south of Mission Street, with the block between Mission and Howard open for local access only. Closure would simplify the intersection of Main/Mission and permit right turns (presently prohibited) from the off-ramp onto Mission Street.

- Davis Street between Clay Street and Washington Street would be opened to improve traffic circulation in the Embarcadero Center area.

- SR-480 Off-Ramp from Bay Bridge: To mitigate the impact of Embarcadero Freeway removal on transit access from the Bay Bridge to the Transbay Terminal, an additional lane would be developed from the first bridge pier to the existing Fremont-Main exit. Thus, the exit ramp would have three lanes, one of which would be a "bus only" lane for exclusive bus access from the Bay Bridge to the Transbay Terminal.

g. Intercept Parking

This alternative includes the development of an intercept parking facility beneath the Bay Bridge between Harrison, Main, Bryant, and Beale Streets as in Alternative II. In addition, the area bounded by Third, Fourth, King, and Berry Streets could be developed as a potential intercept parking site. However, since the I-280 structure east of Fourth Street would be removed in this alternative, this site potentially could be developed for other uses.

h. TSM Improvement along the Northern Waterfront

TSM improvements under Alternative III would be those associated with the Embarcadero roadway reconstruction (including signal modification), Muni E-Line, street and ramp modifications described above, and measures included in Alternative I.

4. Alternative IV

Alternative IV is intended to balance transportation needs with urban design and land use objectives. It includes removal of the portion of I-280 between Third and Sixth Streets and providing of additional entry and exit connections with the local street system; removing the Embarcadero Freeway from Beale Street to Broadway and adding only an exit ramp for I-80 traffic from the remaining segment in the vicinity of Folsom and Spear Streets; reconstructing the Embarcadero surface roadway to anywhere from four to six lanes, depending upon traffic and other design considerations at specific locations along its length; extending Muni Metro rail lines from the Embarcadero Station to the current SP Depot, including an underground turnaround loop east of Embarcadero Station; installing an E-Line streetcar service along the Embarcadero roadway between Fort Mason and the SP Depot; and providing street and ramp modifications, intercept parking, and TSM improvements (see Figure III-9).

a. I-280 Touch-Down

Alternative IV proposes to remove the I-280 Freeway Structure between Sixth and Third Streets and the eastbound off-ramp at Fourth Street. To provide access to the Embarcadero area, a pair of new two-lane ramps would be constructed to connect the freeway with King Street near Sixth Street.

b. Embarcadero Freeway

The Embarcadero Freeway would be removed in this alternative from Beale Street to Broadway. The remaining structure would be reconstructed to accommodate an off-ramp exiting eastbound on the north side of Folsom Street at Spear Street. The off-ramp would channel two lanes off the lower deck on a 6% grade down to Folsom Street, widening to three lanes to prevent backup on the ramp from the signalized intersection at Spear Street. Three existing Folsom Street lanes would flow past the ramp/street intersection. Main Street would be closed by the off-ramp.

c. Embarcadero Surface Roadway

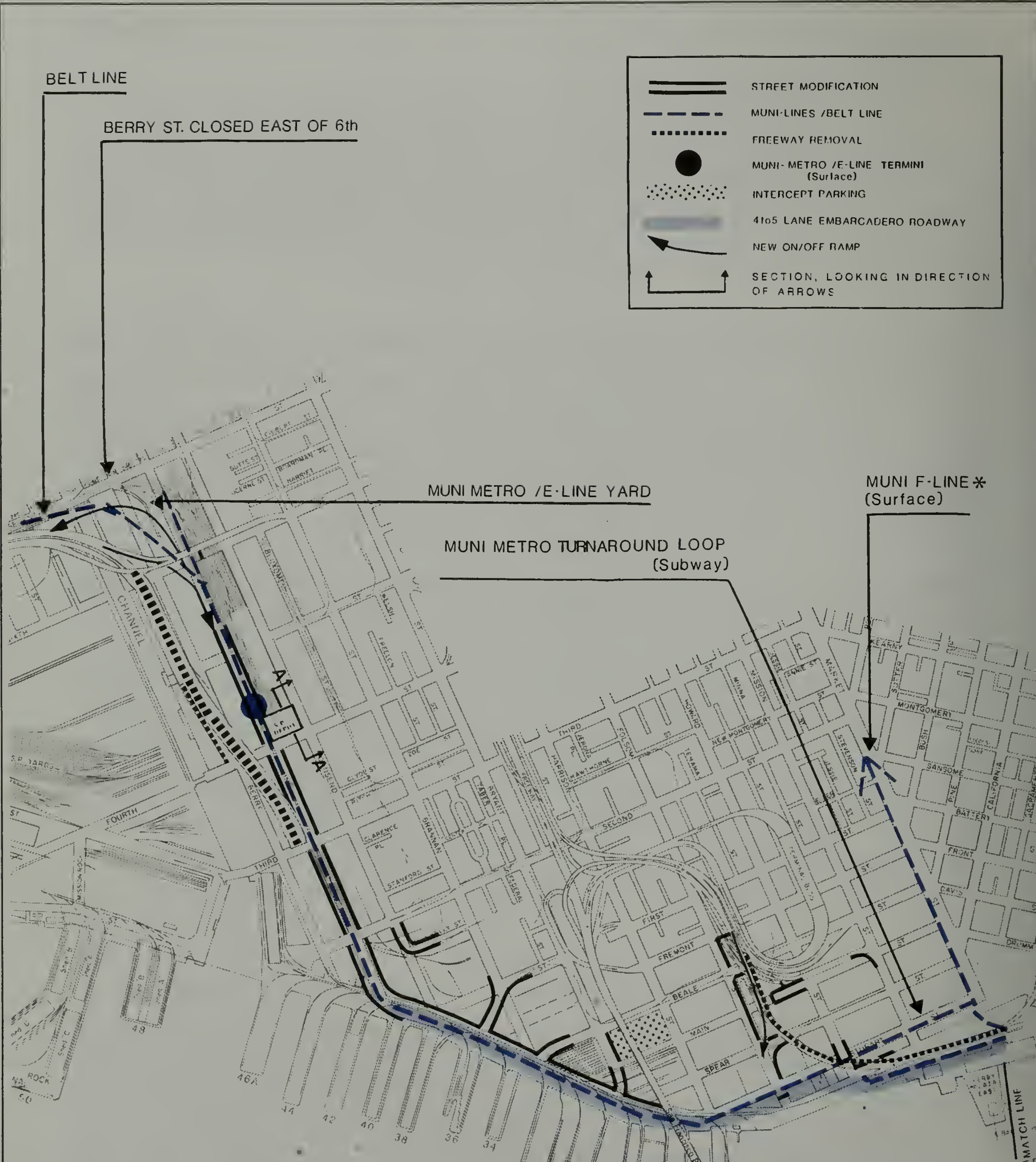
In the China Basin segment, King Street would be reconstructed to provide eight lanes from the new I-280 ramps to Third Street and would then narrow to six lanes. Both the eight- and the six-lane segments would include a center landscaped median with Muni Metro/E-Line tracks (see Figure III-11). As with Alternative III, Fourth Street would be widened for a bus stop in front of the SP Depot (see Figure III-10).

East of Second Street in the South Beach/Rincon Hill area, the road would narrow from six lanes to four. North of Bryant, the Embarcadero roadway would widen to five lanes, three of which would be in the southbound direction. The right-of-way would be approximately 126 feet where a center median accommodates rail lines and 72 feet where the tracks are to one side. As in Alternatives II and III, a 60-foot setback would provide pier access and recreational improvements along the waterfront.

Access would be maintained at Brannan, Beale, Bryant, and Harrison Streets. Street closures under this alternative would be identical to those under Alternatives II and III.

In the Ferry Building area, the 20-foot landscaped median would widen to 50 feet at Howard Street, accommodating the E-Line tracks and landscaping. Access would be maintained at Broadway, Washington, Folsom, Howard and Mission Streets and, as in Alternatives II and III, a southbound left-turn lane at Mission Street would permit U-turns and access to a 400-foot parking bay at the Ferry Building complex. The Folsom and Spear intersection would be redesigned, and portions of Main Street would be closed to accommodate a new off-ramp from the remaining portions of the Embarcadero Freeway.

In the Piers 9 - 35 area, the roadway would narrow back into four lanes, with E-Line tracks in a landscaped median (see Figure III-10). A 30- to 45-foot setback from the bulkhead line would be provided. North of Bay Street, removal of landscaping would further narrow the road to approximately 76 feet. Nevertheless, 10 to 15 feet along the sidewalk of the Pier 39 complex, 10 feet of Seawall Lot 314 (presently containing a gas station and car wash) and a small portion of sidewalk at Grant Avenue would be taken for the roadway. Street closures under this alternative would be identical to those under Alternative III.



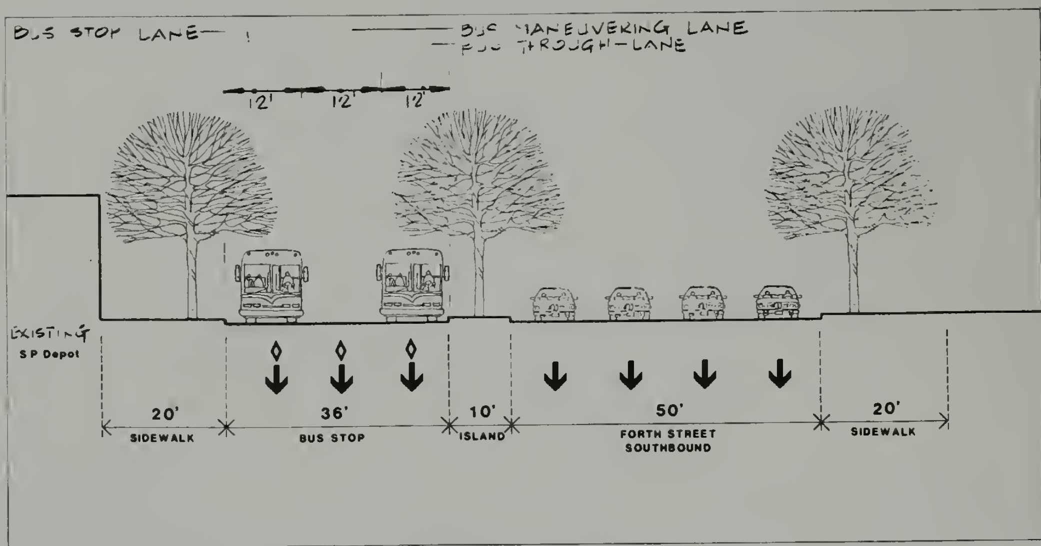
ALTERNATIVE IV

(See Figure III-11 for enlargement of China Basin Segment)

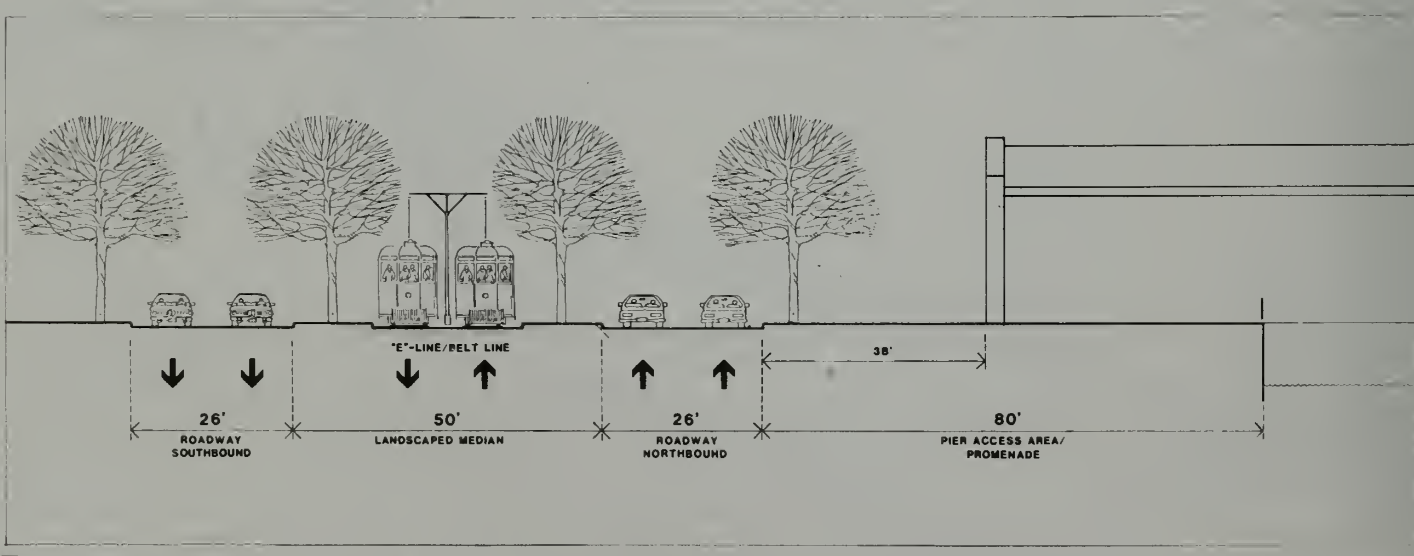
* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

III-9

ALTERNATIVE IV



A. Fourth Street at SP Depot, Looking North



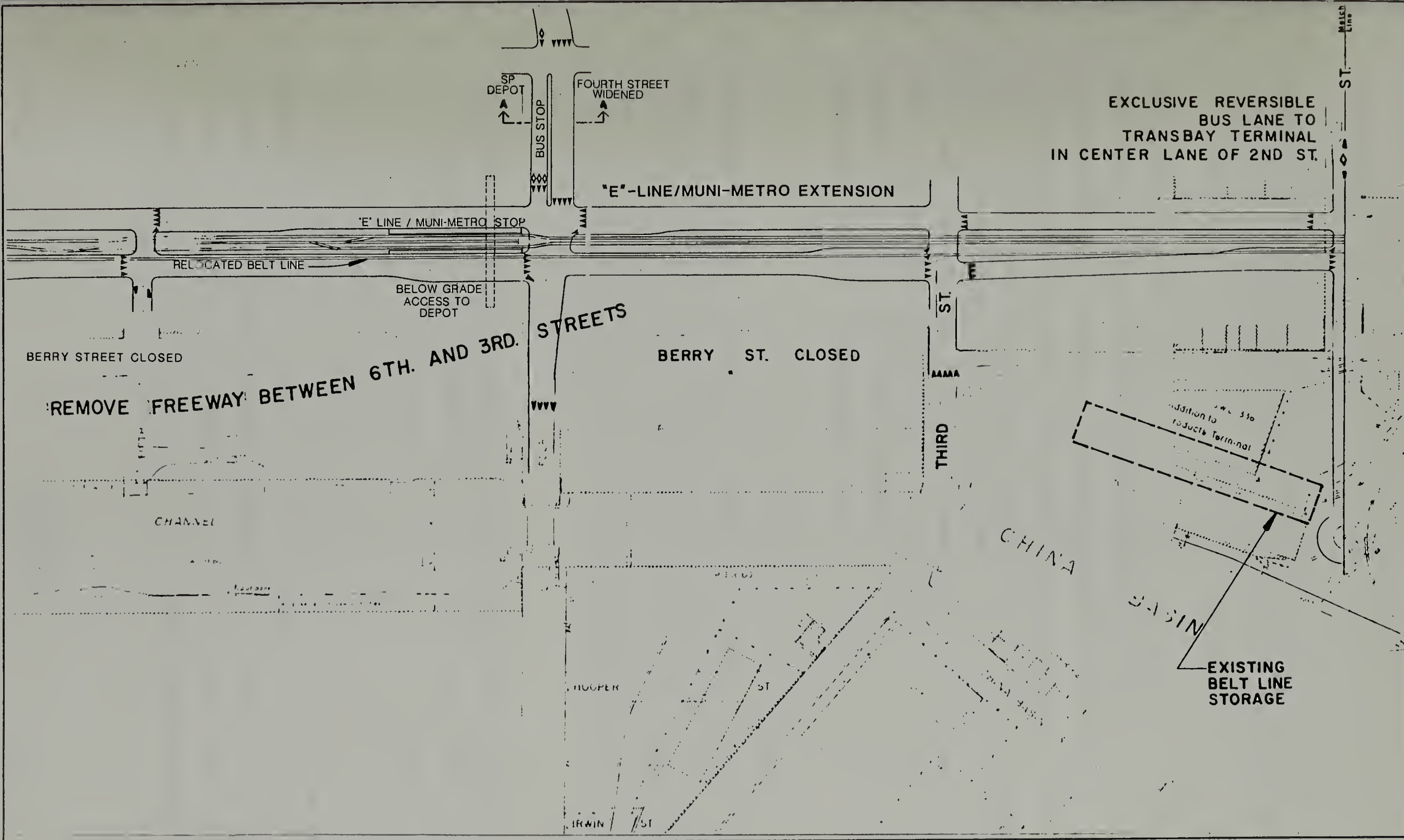
B. Embarcadero Roadway near Pier 23, Looking North

ALTERNATIVE IV: SECTIONS

(See Figure III-9 for specific locations)

SCALE 0 5 10 30 FEET

III-10



ALTERNATIVE IV: ENLARGEMENT OF CHINA BASIN SEGMENT

III-11

In the Fisherman's Wharf area, the Embarcadero roadway would merge with the existing roadway. As in Alternative III, Beach Street would join the Embarcadero roadway at 90 degrees, and portions of Jefferson and Hyde Streets would be open to local access only.

The Belt Line under this alternative would connect to existing tracks east of Seventh Street and parallel the proposed Muni Metro/E-Line yard along Berry Street. East of the yard, the Belt Line would be in the eastbound lane of the reconstructed King Street to Third Street. Between Second and Third Streets the Belt Line would be in the King Street median. In the South Beach/Rincon Hill segment, the Belt Line would parallel the Muni Metro/E-Line track on the west side of the Embarcadero roadway and would cross the roadway near Harrison Street. Through the Ferry Building area, the Belt Line would follow its present alignment. At Howard Street, it would cross the northbound lane of the Embarcadero roadway and connect the E-Line track, which it would share to its terminus at Pier 35. All currently active Belt Line access to piers would be maintained or restored.

d. Muni Metro/Peninsula Commute Service Extension

This alternative proposes extending the Muni Metro line from the Embarcadero Station to the SP Depot at Fourth and Townsend and constructing an underground turnaround loop east of the Embarcadero Station. The Peninsula Commute Service would terminate at the existing depot. As with Alternative III, a car storage yard and maintenance facility would be provided west of the SP Depot, and future Muni Metro transit extension to the south would be possible.

From the SP Depot, Muni Metro would proceed in the median of King Street to Second Street. A station west of Fourth Street would allow underground passenger connection to the SP Depot. From Second Street, Muni Metro would parallel the Belt Line track north of the Embarcadero roadway and along Steuart Street to an intersection with the E-Line north of Howard Street, with a station at Townsend Street and the Embarcadero roadway. The E-Line would head east from this intersection, while Muni Metro would continue north into a subway, with a station near Mission Street, and then to the proposed underground Muni turnaround. The underground turnaround proposed in this alternative would include a full loop east of the Embarcadero Station and under the Justin Herman Park as recommended in the 1978 Muni Track Extension and Turnaround Design Study.[1] The initial service for Muni Metro extension would be identical to Alternative III. As with

Alternative III, service between the Embarcadero Station and SP Depot would be coordinated with Muni's operating plan for the Metro system and adjusted according to demand.

e. Muni E-Line

Like Alternative III, this alternative proposes a Muni E-Line rail service from Fort Mason to SP Depot, along the Embarcadero roadway. South of Howard Street, the E-Line would share facilities with the Muni Metro extension described above. North of Howard Street the E-Line would continue in an exclusive right-of-way shared with the Belt Line into the median of the Embarcadero roadway. There would be a connection with the proposed F-Line rail service at the foot of Market Street. From this interface the E-Line would remain in the roadway median until Beach Street. Between Howard Street and Pier 35, the E-Line would share tracks with the Belt Line railroad in the roadway median.

From Beach Street the westbound track would follow the median onto an exclusive transit right-of-way, using existing tracks, on Jefferson Street to Hyde Street, as described in Alternative III. As in Alternative III, the eastbound track would follow a transit right-of-way along Beach Street between Leavenworth Street and the Embarcadero roadway, and would connect with Jefferson Street at Leavenworth. West of Leavenworth Street, both tracks would follow Jefferson Street to the existing single track through Aquatic Park and the Fort Mason tunnel to a terminus and turnaround located south of the tunnel's west portal and east of Laguna Street.

Stops and headways would be identical to those in Alternative III. Vehicles for the E-Line rail service can be Metro-type LRVs, vintage streetcars, or existing PCC cars, as with Alternative III.

f. Street and Ramp Modifications

This alternative includes the following street and ramp modifications described in Alternatives II or III: making Third and Fourth Streets one way; modifying the Third/King Street intersection; providing an exclusive, reversible transit lane on Second Street; improving the Main Street ramp from the Embarcadero Freeway; closing Columbus Avenue from Leavenworth to Beach; and adding a "bus only" lane from the Bay Bridge to Transbay Terminal.

Alternative IV includes the following additional street and ramp modifications:

- King Street would be reconstructed as an eight-lane boulevard west of Third Street, with E-Line/Muni Metro operating in the median and left and right-turn lanes at major intersections. Berry Street would be closed between Third and Sixth Streets.

- The northbound Third Street approach to the boulevard would have four through lanes and one right-turn lane.

- The new two-lane Embarcadero Freeway off-ramp would widen to three lanes at its intersection with Spear and Folsom Streets. This ramp requires the closure of Main Street between Howard and Folsom Streets and redesign of the Spear and Folsom Street intersection. In addition, Main Street would be open to local access only south of Mission Street.

- Steuart Street would close at Howard Street due to realignment of the Embarcadero roadway and the proposed Muni Metro passenger station.

- Davis Street between Clay Street and Washington Street would be opened to improve traffic circulation in the Embarcadero Center area.

g. Intercept Parking

This alternative includes the development of an intercept parking facility under the Bay Bridge between Harrison, Main, Bryant, and Beale Streets, as in Alternative III.

h. TSM Improvement along the Northern Waterfront

Alternative IV includes the TSM improvements proposed for Alternative I and those associated with Embarcadero roadway reconstruction/signal modification, the Muni E-Line, and street modifications described above. In addition, Alternative IV would make Bay and North Point Streets one-way between Columbus Street and Van Ness Avenue and add intersection signal interconnection along King Street and the Embarcadero surface road.

5. Alternative IVA

Alternative IVA evolved from Alternative IV and includes design options and variations proposed for evaluation by the City of San Francisco, Caltrans, and the Metropolitan Transportation Commission. Alternative IVA includes removal of the I-280 Freeway structure between Third and Sixth Streets and adding entry and exit connections with the local street system; removing the Embarcadero Freeway from Beale Street to Broadway and adding both off- and on-ramps for I-80 traffic from the remaining segment; reconstructing the Embarcadero roadway to between four and six lanes; improving

pedestrian access and adding a Muni trolley bus turnaround in the Ferry Building area; extending Muni Metro rail lines from the Embarcadero Station to the existing SP Depot including a subway turnaround loop east of Steuart Street; providing E-Line streetcar service along the Embarcadero roadway between Fort Mason and the SP Depot; and providing street and ramp modifications, intercept parking and TSM improvements (see Figure III-12).

a. I-280 Touch-Down

Alternative IVA would remove the I-280 Freeway structure from Third Street to Sixth Street, including the existing off-ramp to Fourth Street. Two new ramps are proposed to connect the remaining freeway with the Embarcadero roadway via Berry and King Streets as a one-way couplet (see Figure III-13).

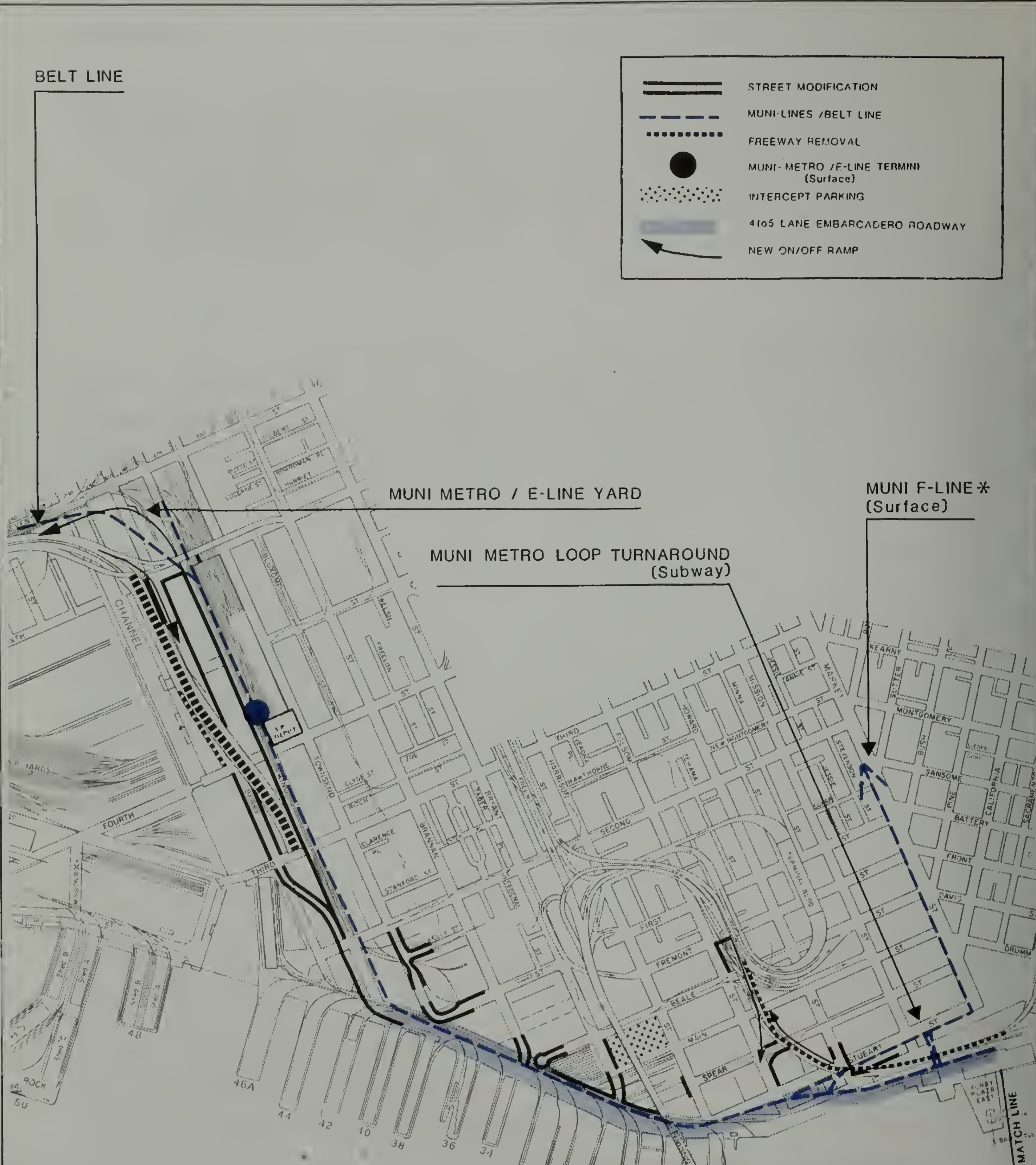
b. Embarcadero Freeway

The Embarcadero Freeway would be removed from Beale Street to Broadway. The remaining structure would be adapted to permit construction of an off-ramp exiting eastbound at Spear Street and an on-ramp extending from the intersection of Howard Street and the Embarcadero roadway (see Figure III-14). The off-ramp would channel two lanes of freeway traffic, widening to three lanes at its base. The on-ramp would begin with three lanes and merge to two lanes before reaching the freeway's upper deck. The on-ramp would require Steuart Street to be closed to all vehicular traffic south of Howard Street. Main Street under the off-ramp would be lowered and narrowed to two-lane width.

c. Embarcadero Surface Roadway

In the China Basin segment King and Berry Streets would be reconstructed to connect the new I-280 on- and off-ramps at Sixth Street with the Embarcadero roadway. East of Third Street, Berry Street would follow a new alignment to provide direct connection with the Embarcadero roadway. Berry and King Streets would each carry four lanes near Fifth Street, but would merge to two lanes where they meet the Embarcadero roadway at Second Street.

East of Second Street the Embarcadero roadway would continue as a four-lane boulevard to Howard Street. Within this section, the right-of-way would be approximately 126 feet



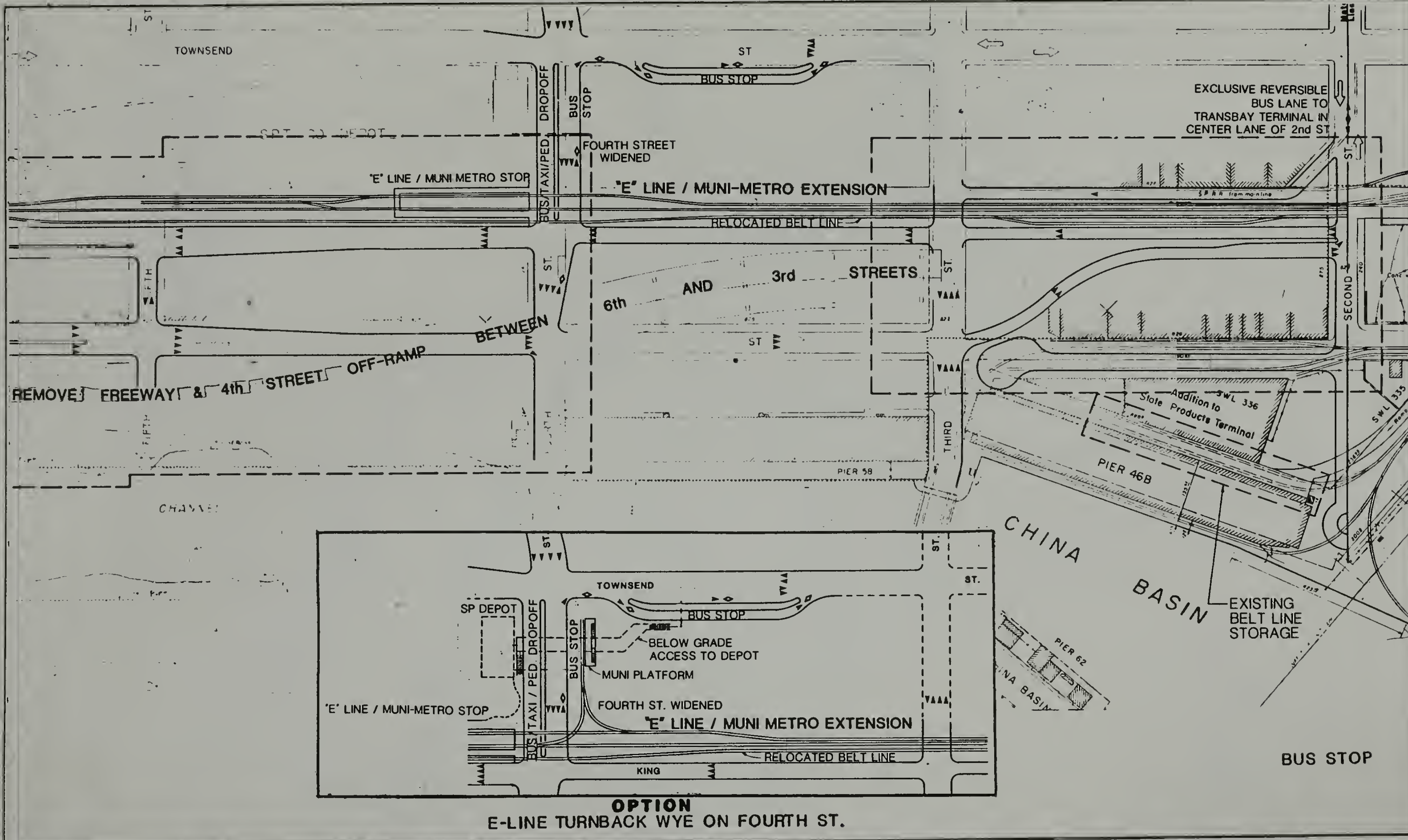
ALTERNATIVE IVA

(See Figures III-13 and III-14 for enlargements of China Basin and Ferry Building Segments)

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

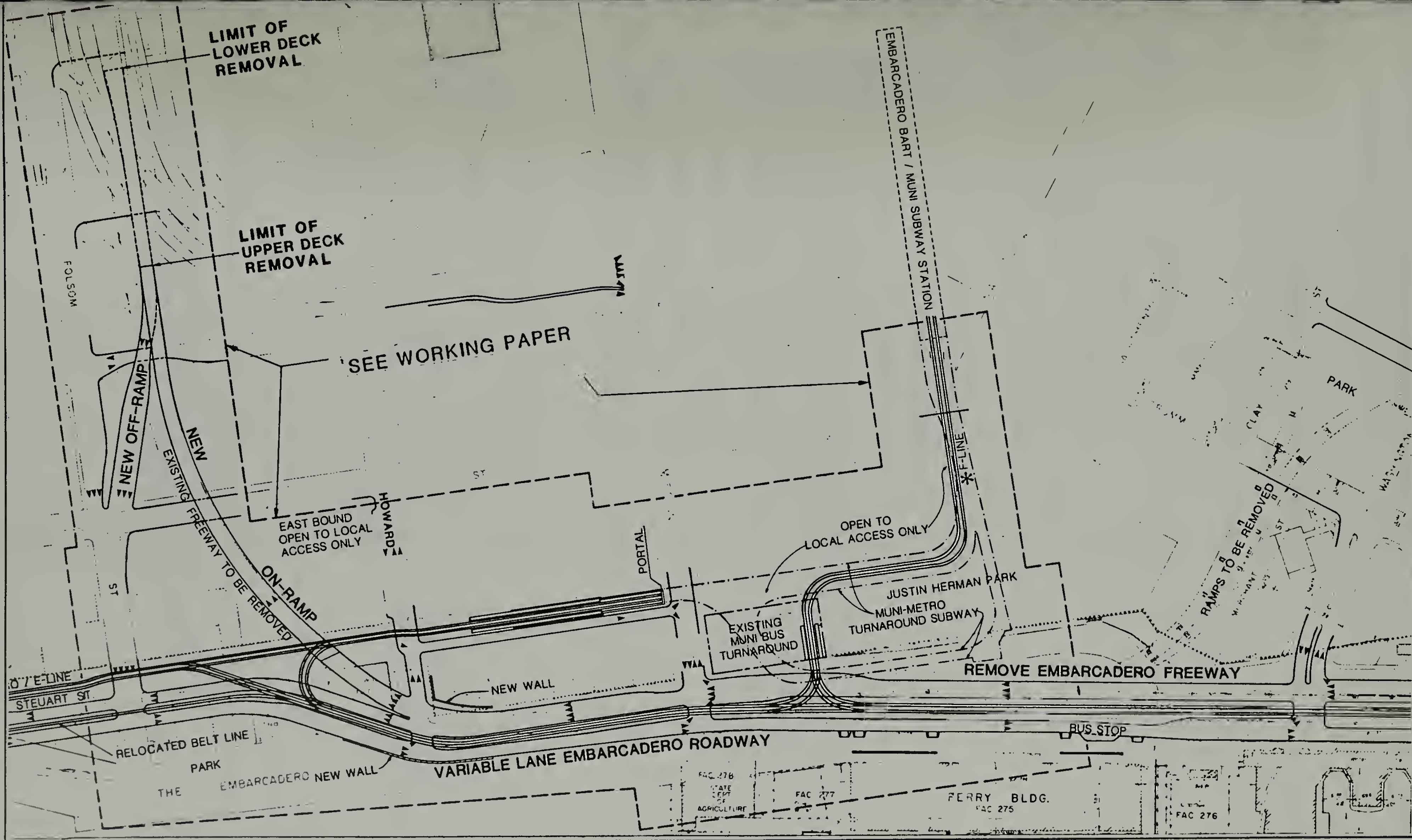
III-12

ALTERNATIVE IV-A



ALTERNATIVE IVA: ENLARGEMENT OF CHINA BASIN SEGMENT

III-13



ALTERNATIVE IV-A: ENLARGEMENT OF FERRY BUILDING SEGMENT

III-14

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

with a 20-foot median, two 26-foot roadways and a 54-foot-wide Muni Metro/E-Line/Belt Line exclusive right-of-way on the inland side of the roadway. As in Alternatives II-IV, the roadway would be set back from the waterfront line by 60 feet.

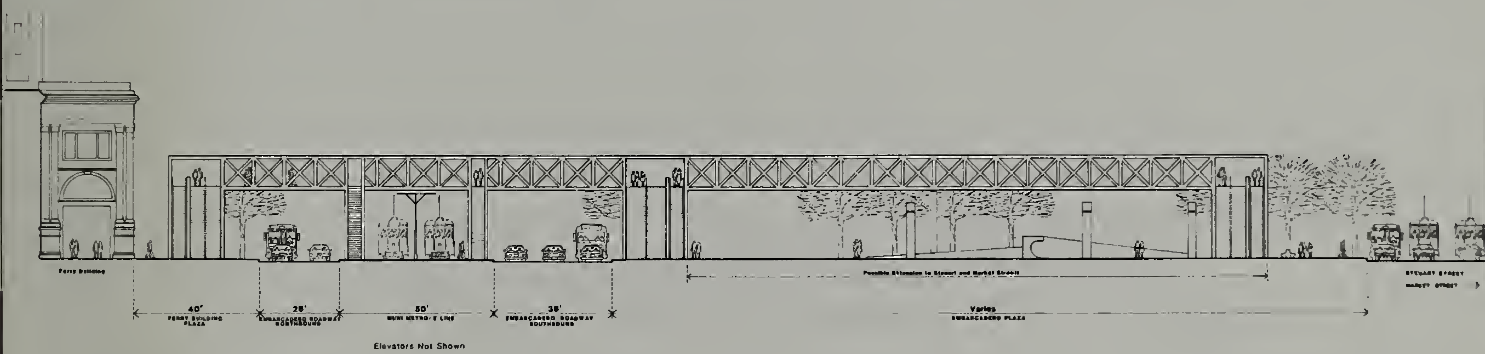
Street closures and rerouting in the South Beach/Rincon Hill segment would conform with the San Francisco Redevelopment Agency plan for that area. Townsend, First, Spear and Beale Streets would be closed while Brannan, Bryant and Harrison Streets would be realigned to make the intersections more perpendicular with the Embarcadero roadway. Access to Second and Howard Streets would also be maintained.

In the Ferry Building area, between Howard and Broadway, the Embarcadero roadway would have three southbound and two northbound lanes, except between Howard and Mission, where there would be four southbound lanes. The median would widen to 29 feet north of Howard and to 50 feet north of Mission Street to accommodate the E-Line/Belt Line tracks and landscaping on either side. Access would be maintained at Broadway and at Folsom, Mission and Washington Streets, as in Alternatives II -IV, and an exclusive left-turn lane at Mission Street would permit U-turns and access to the Ferry Building. The Folsom and Spear Street intersection would be redesigned to accommodate the new Embarcadero Freeway off-ramp. In contrast to Alternative IV, Main Street would not be closed by the new off-ramp. Because of the removal of the Embarcadero Freeway ramps at Washington Street, Davis Street between Clay and Washington could be reopened.

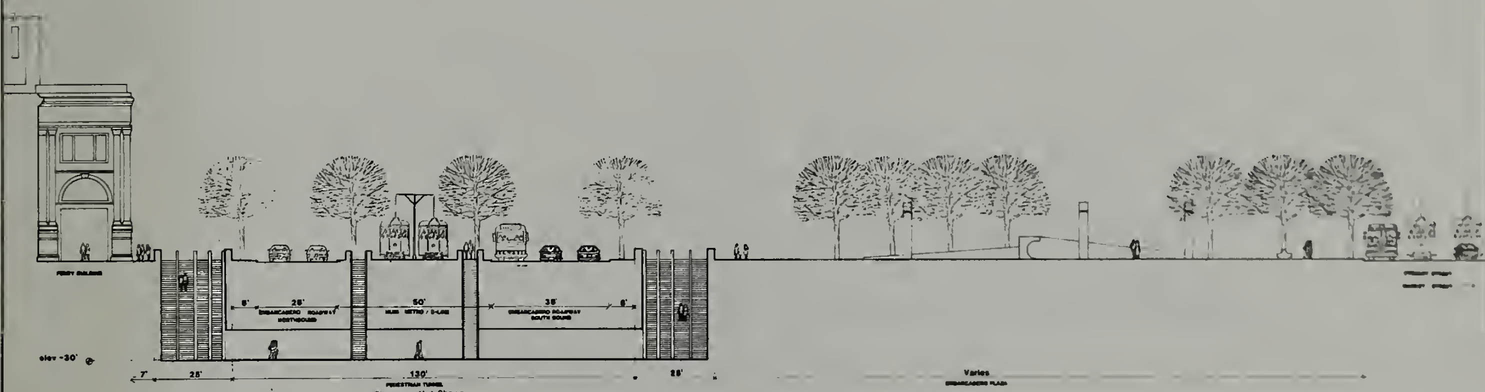
As a design option, pedestrian access to the Ferry Building could be improved by an underground pedestrian walkway or a pedestrian bridge across the Embarcadero roadway, with connections to the E-Line stops in the median (see Figure III-15). Alternative IVA considers a Muni trolley bus turnaround in the Ferry Building area for which several schemes are possible (see Figure III-16). One such scheme would require widening of the roadway median in front of the Ferry Building.

North of Broadway, between Piers 9 and 39, the roadway would narrow into four lanes with southbound left-turn pockets for access to piers. The 102-foot-wide right-of-way would include a 50-foot landscaped median and the E-Line tracks. As in Alternative IV, the roadway would narrow to about 76 feet north of Bay Street; however, an additional 10 to 15 feet along the sidewalk of the Pier 39 complex, 10 feet of Seawall Lot 314 and a

A. At-grade



B. Overcrossing

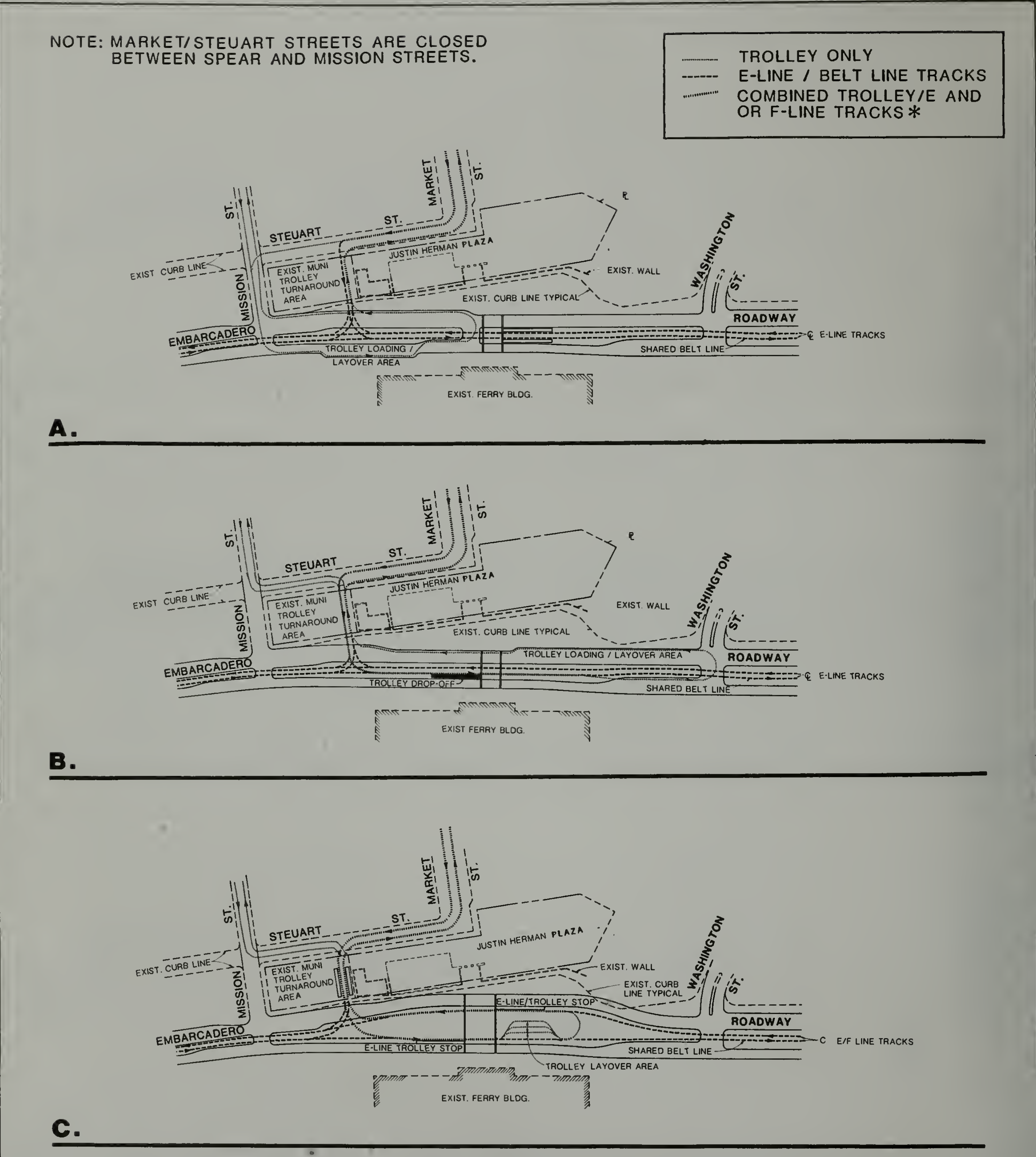


C. Undercrossing

FERRY BUILDING PEDESTRIAN ACCESS DESIGN OPTIONS

SCALE 0 10 20 60 FEET

III-15



MUNI TROLLEY BUS TURNAROUND DESIGN OPTIONS

SCALE 0 50 100 200 FEET

III-16

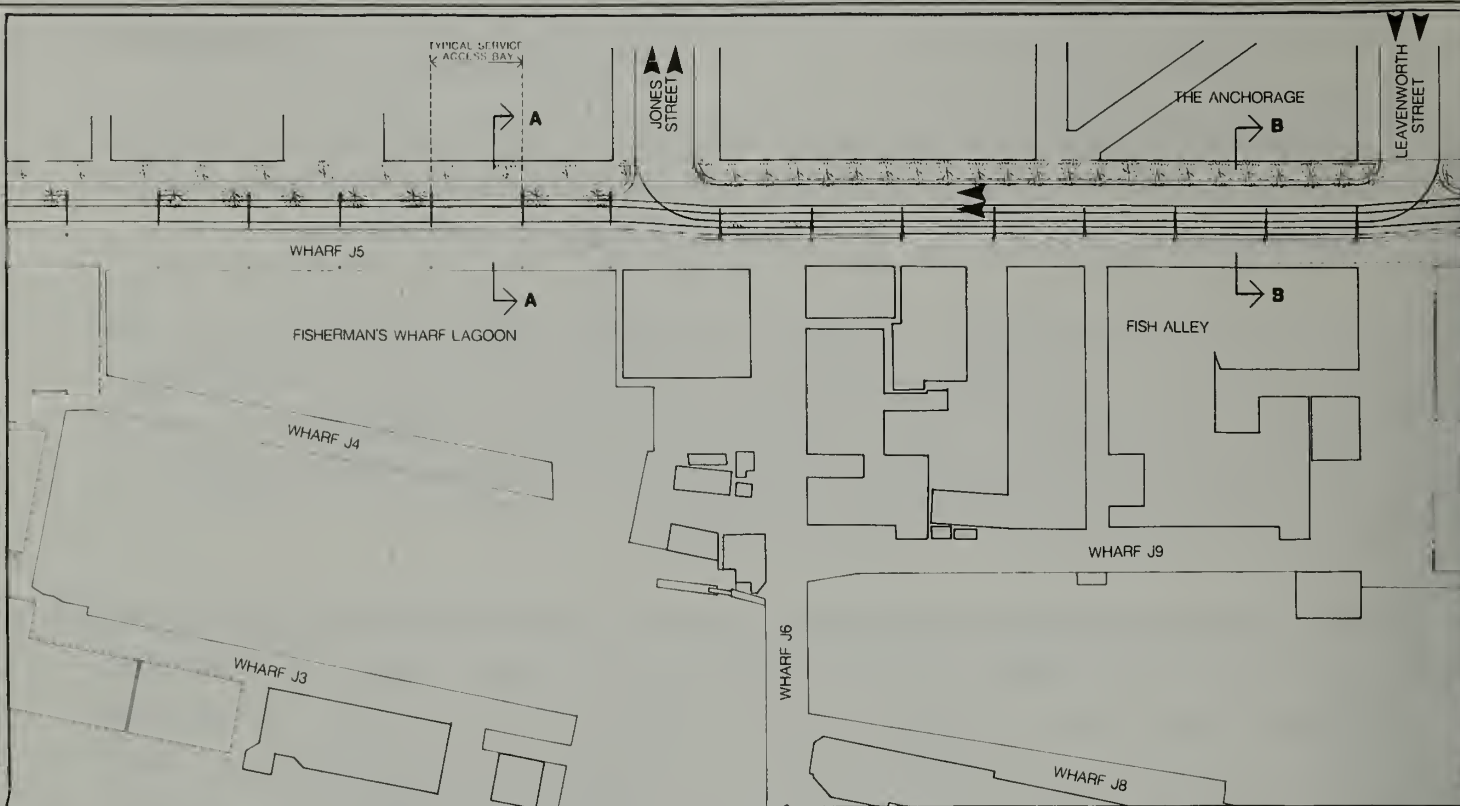
* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

small portion of sidewalk at Grant Avenue would be required for the roadway. Turn lanes would be provided at Union, Lombard, Bay, and North Point Streets. Off-street queuing lanes could be added at Pier 35 to accommodate the passenger terminal needs.

In the Fisherman's Wharf area, the Embarcadero roadway would continue with the E-Line in the median. As with Alternatives III and IV, an additional 10 to 15 feet of frontage would be required to accommodate the E-Line in the median. This would require removal of existing parking but would not affect sidewalks. Beach Street would be realigned to intersect the Embarcadero roadway at ninety degrees.

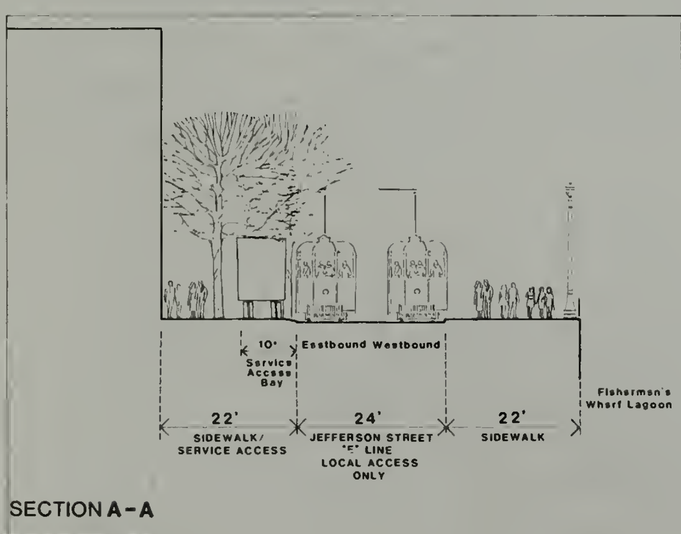
The Embarcadero surface roadway would end at Powell Street and a local two-lane, two-way street would continue along the bulkhead to Taylor Street. West of Powell Street, Jefferson Street would be closed to through traffic with the exception of one block between Jones and Leavenworth Streets. The blocks of Jefferson closed to through traffic would feature E-Line tracks in the center and pedestrian areas on either side (see Figure III-17). Local access only would be allowed for commercial vehicles. Hyde Street would be for local access only between Jefferson and Beach Streets.

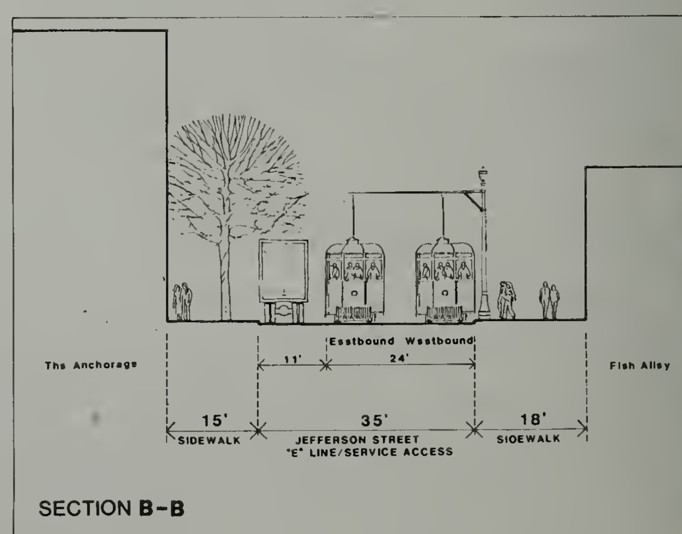
The Belt Line would use existing tracks south of the proposed Muni Metro/E-Line yard adjacent to Berry Street. East of the yard, the Belt Line would pass on the north side of the Muni Metro/E-Line yard leads, cross to the south side and parallel the transit tracks to Second Street. Between Third and Second Streets a parallel runaround track would be provided. Throughout the South Beach/Rincon Hill segment, the Belt Line would run east of the Muni Metro/E-Line tracks. At Harrison Street, the Belt Line would cross into the Embarcadero roadway median. North of Folsom Street, it would share the E-Line tracks to its terminus at Pier 35. All currently active Belt Line access to piers would be maintained or restored. As with Alternatives III and IV, the sharing of tracks with E-Line would require lowering the Belt Line minimum vertical clearance requirement by 6 to 12 inches where streetcars (PCC or historic cars) are used and by as much as 4 feet where LRVs are used. While technically feasible, any such variance in Belt Line vertical clearance requirement requires approval of the San Francisco Port Commission and the California State Public Utilities Commission.



PLAN

SCALE 0 50 100 200 FEET





SECTIONS

SCALE 0 15 30 60 FEET

ALTERNATIVE IVA: JEFFERSON STREET TRANSIT MALL

III-17

d. Muni Metro/Peninsula Commute Service Extension

Alternative IVA proposes to extend the Muni Metro line from the Embarcadero Station to the SP Depot at Fourth and Townsend Streets. The Peninsula Commute Service would not be extended beyond the existing depot. A car storage yard and maintenance facility would be located west of the SP Depot, and future Muni Metro extension to the south would be possible.

The Muni Metro would use King Street right-of-way to Second Street. King Street would be shifted south to accommodate the rail lines. A station with side platforms and at-grade sidewalk would be provided west of Fourth Street, adjacent to the SP Depot. (Alternative IV provides this stop in the median of King Street with underground pedestrian access to the SP Depot.) A third track west of the station area would provide for a turnback and temporary storage. From Second to Harrison Streets, the Muni Metro would parallel the Belt Line track west of the Embarcadero roadway with a station near Townsend Street. From Harrison, the Muni Metro would continue in Steuart Street and meet with the E-Line at a "Y" intersection between Folsom and Howard Streets. The E-Line would head east and north from this location, while the Muni Metro would continue north in Steuart Street. An at-grade stop with side platforms would be located north of Howard before the tracks enter a portal just south of Mission Street and descend into the subway, where a complete underground turnaround loop is proposed to be built under the Justin Herman Park and the Embarcadero roadway.

Proposed service for Muni Metro extension would be identical to Alternatives III and IV. As with Alternatives III and IV, service between the Embarcadero Station and the SP Depot would be coordinated with Muni's operating plan for the Metro system and adjusted by demand.

e. Muni E-Line

Alternative IVA proposes Muni E-Line rail service from Fort Mason to the existing SP Depot. The Muni E-Line and Muni Metro would intersect between Howard and Folsom Streets. South of this intersection, the E-Line would share tracks, stations, and yard facilities with the Muni Metro extension described above. As an option, an E-Line turnback and station could be added on the east side of Fourth Street (see Figure III-13). An underground pedestrian connection across Fourth Street would provide a protected interface between the E-Line station and the SP Depot. North of the E-Line/Metro

intersection the E-Line would continue with two tracks to Powell Street in an exclusive right-of-way within the generally 50-foot-wide median of the Embarcadero roadway. An interface with the proposed F-Line would be provided at south of Market Street. From Powell Street both tracks would turn onto Jefferson Street, to Aquatic Park. Jefferson Street would be open for local access only, except for the block between Jones and Leavenworth, where an eastbound traffic lane would be added (see Figure III-17). The two tracks would then merge into the single existing track through Aquatic Park and the Fort Mason tunnel to a terminus and turnaround located south of the tunnel's west portal, east of Laguna Street. A siding for the single-track segment through Aquatic Park could be added as required or desired by Muni. Station stops and service would be as described for Alternatives III and IV.

f. Street and Ramp Modifications

Alternative IVA includes the following street and ramp modifications previously described in Alternatives II, III or IV: extension of Davis Street, closure of Columbus Avenue from Leavenworth to Beach Streets, an exclusive, reversible transit lane on Second Street, and adding a "bus only" lane from the Bay Bridge to the Transbay Terminal (the bus lane would be studied further during preliminary design).

Alternative IVA includes the following additional street and ramp modifications:

- Third Street would have three northbound and one southbound lane from Fourth to Townsend Streets.
- Fourth Street would have two southbound lanes and one northbound lane from Third to Berry Streets, with an additional southbound lane from Berry to Townsend Streets. Fourth Street would have three additional southbound lanes for a drop-off and bus stop zone in front of the SP Depot.
- The existing Berry Street, between Third and Second Streets, would terminate in a cul-de-sac at Third Street with access only from Second Street.
- The Berry/Sixth Street intersection would be modified to provide a major boulevard to the south, a two-lane eastbound and one-lane westbound connection to Berry Street and two lanes extending southbound across the China Basin.
- Townsend and First Streets would be connected with a two-lane roadway and would no longer have access to the Embarcadero roadway.
- Beale Street would be closed at the Embarcadero roadway with a cul-de-sac.

- The Embarcadero Freeway/Main Street exit ramp would be improved by adding a right-turn lane onto Mission Street. Main Street would remain open with a right-turn lane at Mission Street. The off-ramp would be widened to provide a left-turn, a right-turn, and three through lanes.

- Howard Street would be restricted to two westbound lanes from the Embarcadero roadway to Steuart Street. One lane of eastbound traffic would be permitted only to Steuart Street, which would serve as the "escape" route for Howard Street traffic.

- Steuart Street would be closed south of Howard Street. North of Howard Street it would have a local access lane between Howard and Mission Streets.

- Market Street would be closed at Spear Street to provide a pedestrian mall for the Muni F-Line from Market Street onto Steuart Street and thence eastbound through the present trolley bus turnaround area.

- Chestnut Street would be closed to through traffic between the Embarcadero roadway and Montgomery Street.

- Kearny and North Point Streets would be connected but would be closed off from the Embarcadero roadway.

- Hyde Street would be left open for local traffic only from Jefferson to Beach Streets.

g. Intercept Parking

Alternative IVA includes the development of an intercept parking facility beneath the Bay Bridge in an area bounded by Harrison, Main, Bryant, and Beale Streets.

h. TSM Improvements along the Northern Waterfront

TSM improvements would include measures associated with the Embarcadero roadway reconstruction, Muni E-Line, and street modifications described above; making Bay and North Point Streets a one-way couplet between Columbus and Van Ness; adding signal interconnection along King, Berry, and the Embarcadero roadway; and the measures described under Alternative I.

6. Alternative V

This alternative features addition of I-280 exit and entry ramps at Second and King Streets; removing the Embarcadero Freeway from Fremont Street to Broadway and providing on-off ramps near Folsom and Spear Streets for Bay Bridge traffic from the remaining segment; reconstructing the Embarcadero surface roadway with four to six

lanes, depending upon traffic needs and other design considerations at specific locations; extending the Peninsula Commute Service to downtown (as proposed by Caltrans) and Muni Metro rail lines to the existing SP Depot and adding an underground turnback at the Embarcadero Station; providing an E-Line streetcar service from Fort Mason to an interface with the proposed F-Line at the Ferry Building; and street and ramp modifications, intercept parking, and TSM improvements (see Figures III-18 and III-19).

a. I-280 Touch-Down

The existing I-280 Freeway structure and Fourth Street off-ramp would remain. Two new two-lane ramps would extend from the Embarcadero roadway at Second Street to the existing stub-end of the freeway at Third Street. The off-ramp would widen at its base for a third, left-turn lane. The freeway deck would require striping, pavement markings, curbs, and barricade provisions to properly transition ramp traffic on and off the existing structure.

b. Embarcadero Freeway

The existing Embarcadero Freeway structure would be removed from Fremont Street to Broadway. Remaining portions of the existing freeway would be reconstructed as in Alternative IVA to accommodate a proposed off-ramp at Spear Street and a proposed on-ramp extending from Howard Street at the Embarcadero roadway.

c. Embarcadero Surface Roadway

In the China Basin segment, the roadway would connect to the new I-280 ramps near Second Street between King and Berry Streets. King Street would be closed east of Sixth Street, but a 40-foot right-of-way between Second and Third Streets would be used as an access road. Berry Street between Second and Fourth Streets would be made two-way to provide access between Third or Fourth Street and the Embarcadero surface road. In the South Beach/Rincon Hill segment, the roadway would be four lanes and have a 20-foot landscaped median and median turn pockets as far as Bryant Street. From Bryant to Harrison Streets the roadway would widen to five lanes, three southbound and two northbound. As in Alternatives II, III, and IV, there would be a 60-foot setback from the Waterfront Line.

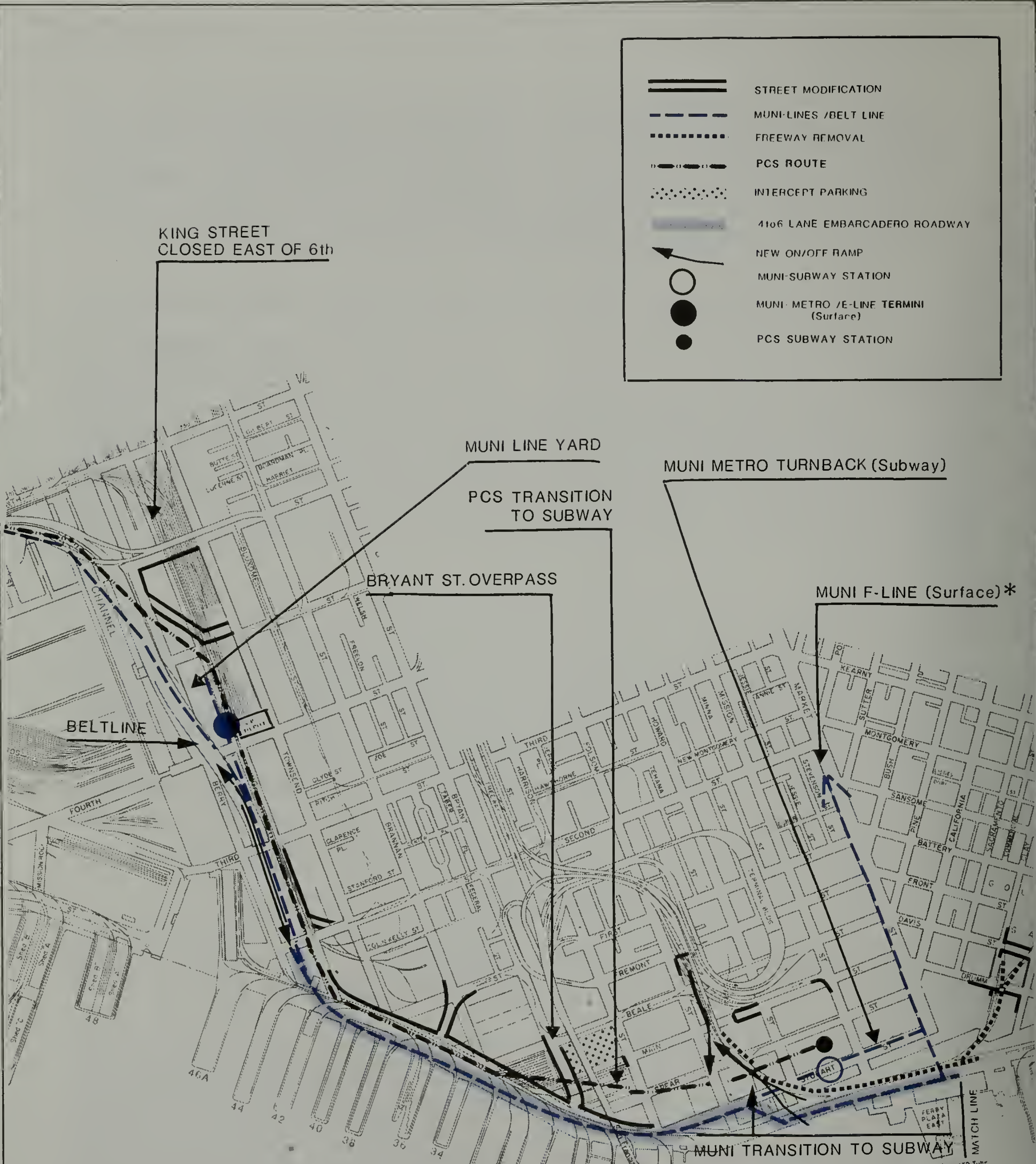
Access would be maintained at Brannan, Bryant, Harrison, and Second Streets. As in Alternatives II, III, and IV, Townsend and First Streets would be closed to The Embarcadero, while Brannan would be realigned to meet the Embarcadero roadway at 90 degrees. The Bryant Street realignment would be similar to that in Alternatives II, III, and IV, but it would bridge over the Peninsula Commute Service rail line.

In the Ferry Building area, the roadway would widen to six lanes. North of Mission Street, the 20-foot-wide median would increase to 50 feet for the E-Line. Northbound, The Embarcadero would have left-turn lanes at Howard, Mission, Washington, and Broadway. The southbound roadway would have right-turn lanes at Broadway, Washington, Mission, Howard, and Harrison. As in Alternatives II-IVA, an exclusive left turn lane at Mission Street in the southbound direction would permit U-turns and access to the Ferry Building. Two 400-foot-long drop-off and parking bays would be provided at the Ferry Building complex.

In the area from Piers 9 - 35, the roadway would narrow back to four lanes. Between Broadway and Bay Streets, the 102-foot right-of-way would contain the E-Line/Belt Line tracks and landscaping in a 50-foot-wide median. As with Alternatives III and IV, removal of median landscaping north of Bay Street would reduce the width of the right-of-way to 76 feet, but portions of sidewalks near Pier 39 and from Seawall Lot 314 and a small portion of sidewalk at Grant Avenue would be taken. Access would be maintained at Broadway, Union, Lombard, and Bay Streets. Under this alternative, the roadway would be set back from the bulkhead line between 30 feet and 45 feet to provide pier access and recreational improvements along the waterfront.

Along the Fisherman's Wharf and Fort Mason/Aquatic Park segments, the street and traffic system would be identical to that described in Alternatives III and IV.

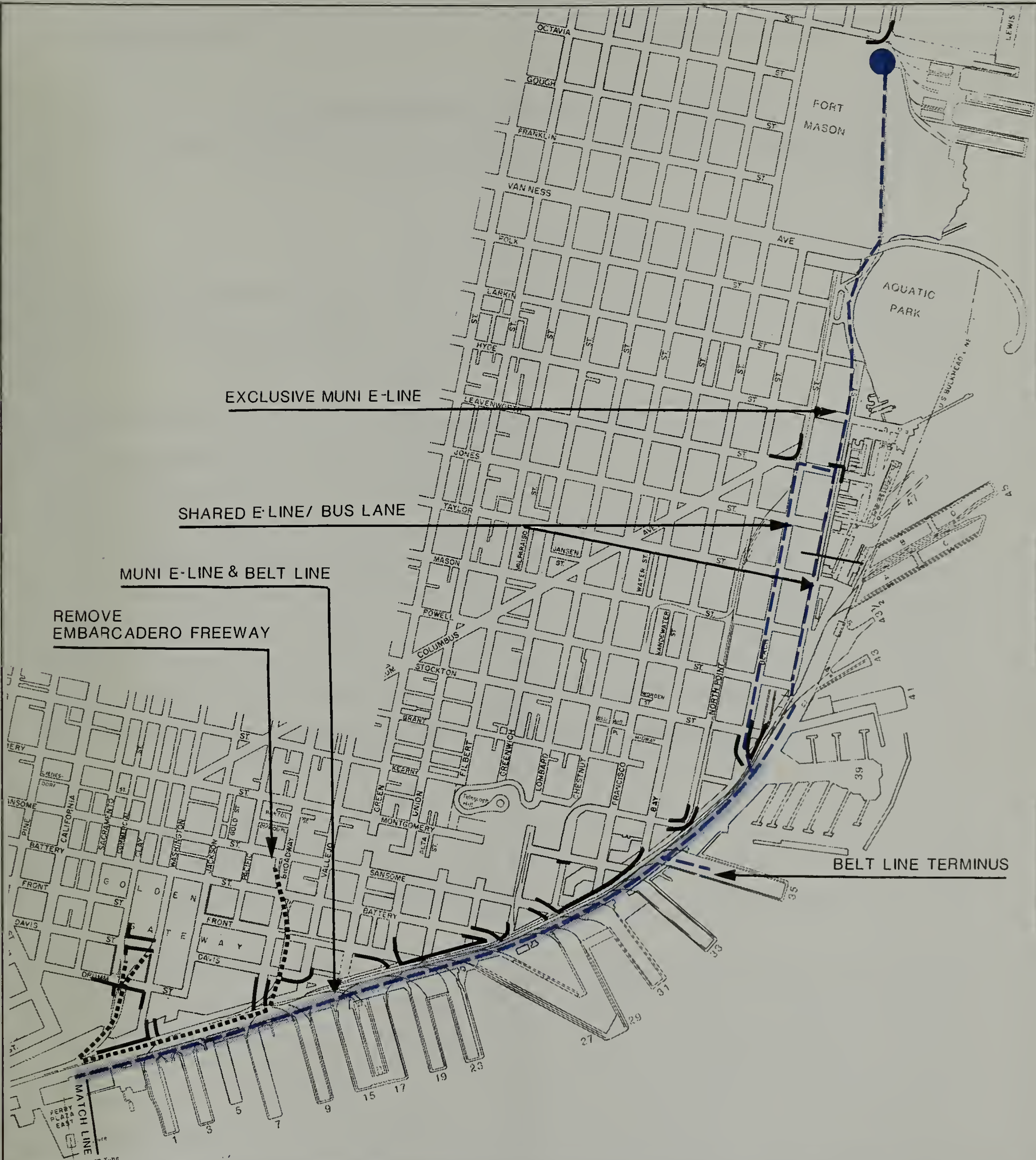
The Belt Line would share the proposed PCS tracks to Berry Street and would then parallel the proposed Muni Metro tracks through the South Beach/Rincon Hill segment. From Harrison Street to Howard, the Belt Line would follow its existing alignment across and parallel to the Embarcadero roadway. At Howard Street, it would cross northbound lanes of the roadway and merge with the median described above. It would continue in



ALTERNATIVE V

(See Figure III-19 for enlargement of Ferry Building Segment)

*NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY



III-18

ALTERNATIVE V

the median to a connection with the E-Line track, which it would share to Pier 35, where the Belt Line service terminates. All currently active Belt Line access to piers would be maintained or restored.

d. **Muni Metro/Peninsula Commute Service Extension**

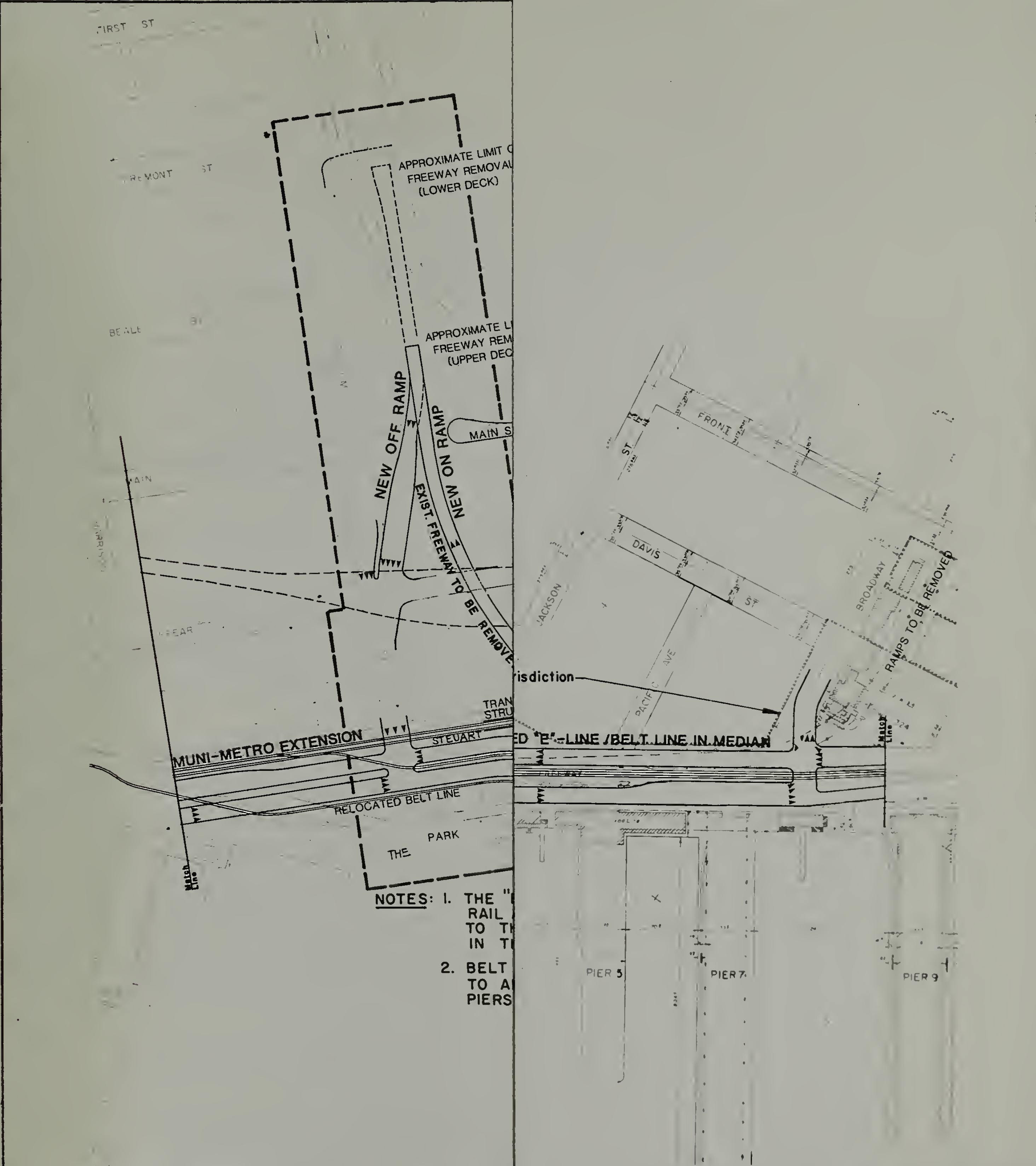
This alternative proposes extending the Muni Metro line from the Embarcadero Station to the existing SP Depot at Fourth and Townsend and extending the Peninsula Commute Service from the existing depot to Rincon Annex in downtown San Francisco.

A Muni storage yard would be located west of the SP Depot in the area bounded by Fifth, Fourth, Berry and King Streets. From here Muni Metro would parallel King Street to Second Street with a station located west of Fourth Street. From Second Street the line would follow the west side of the Embarcadero roadway to Harrison Street, with a station near Townsend Street. The line would descend along Steuart Street into a subway south of Howard Street and connect to a turnback at the east end of the Embarcadero Station. A subway station would be located north of Howard Street with an underground passenger connection to the proposed PCS terminal at Rincon Annex. The proposed Muni turnback at the Embarcadero Station would be the same as that described for Alternatives II and III. Service between the Embarcadero Station and SP Depot would also be as described in Alternatives III and IV.

The proposed extension of the Peninsula Commute Service line would be an at-grade two-track line (35- to 40-foot right-of-way) from China Basin to the waterfront, becoming a subway line north of the Bay Bridge to an underground station at Rincon Annex.

The extended tracks would cross China Basin on a trestle and proceed under the I-280 Freeway structure to and along King Street. King Street would be closed east of Sixth Street, but access to properties between Third and Second would be possible via a service lane. At-grade rail crossings would occur at Fourth, Third, and Second Streets. Noise-absorbing walls, six feet high, are proposed to enclose the trackway and would be breached only at street crossings. The existing SP Depot and trackage would likely be relocated to a location adjacent to the proposed Muni station west of Fourth Street.

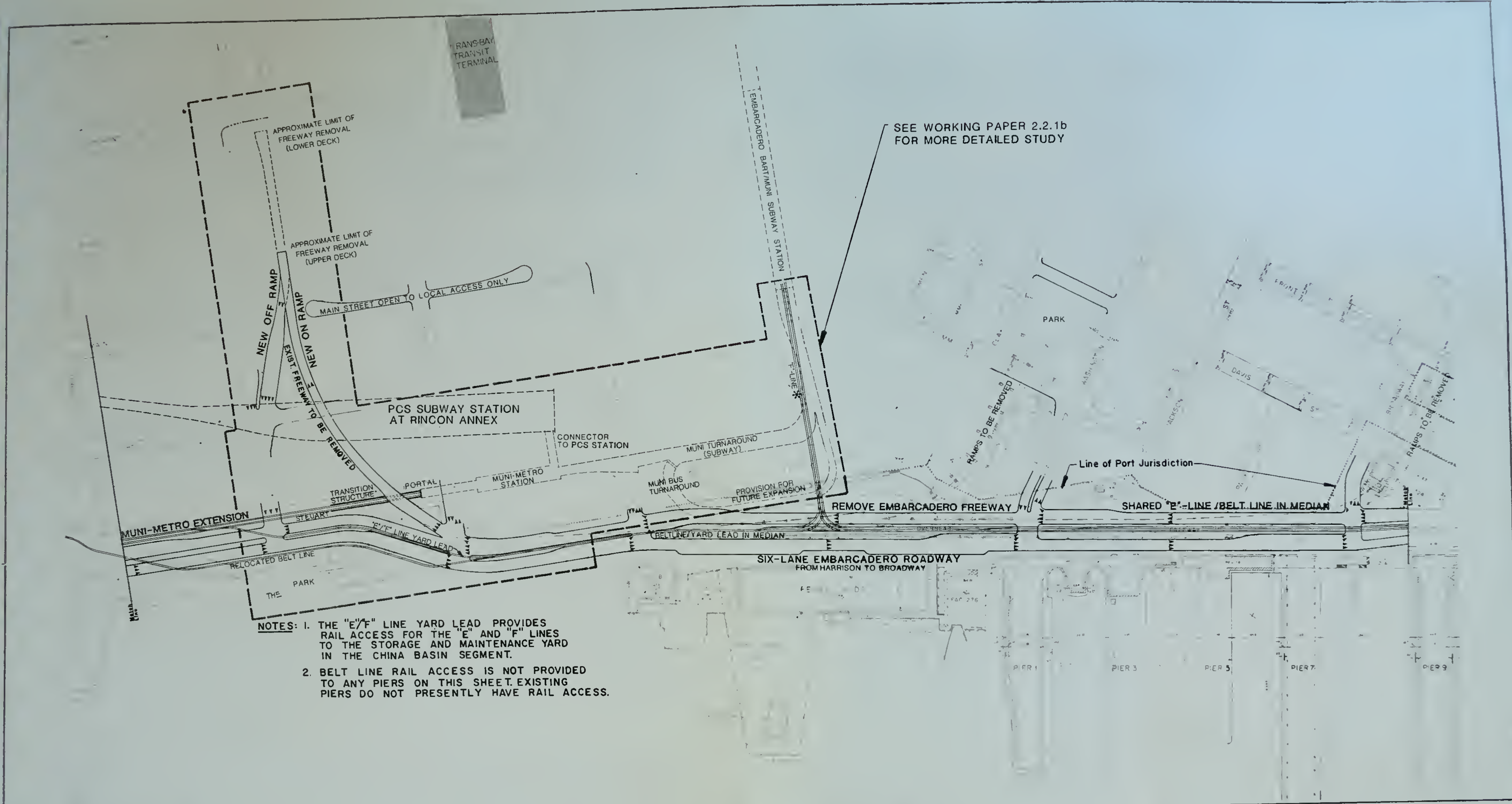
The tracks and six-foot walls would curve north, parallel to the E-Line, Belt Line, and Embarcadero roadway. The tracks would cross the realigned Brannan Street at-grade and



ALTERNATIVE V ENLA

SCALE 0 200 400 600 FEET

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP



ALTERNATIVE V ENLARGEMENT OF FERRY BUILDING SEGMENT

SCALE 0 200 400 600 FEET

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

III-19

pass under the Bryant Street overpass. Portions of Main and Beale Streets would be closed to through traffic. The line would enter a subway portal just south of Harrison Street and terminate in an underground station beneath Rincon Annex. At the station, six platforms would be provided for train boarding and alighting. An underground passenger connection would be provided between the rail station and the Muni Metro subway station north of Howard Street.

The type of cars and service provided for the Peninsula Commute Service extension have yet to be determined. For this alternative, it is assumed that the existing diesel locomotives and passenger cars would be used and average train headway would be six minutes during peak periods.

e. Muni E-Line

Under this alternative, the E-Line would extend from Fort Mason to a connection with the proposed F-Line at Market Street. A yard lead would continue south and connect to the proposed Muni Metro tracks south of Folsom Street. North of Market Street the E-Line would run in the landscaped median of the Embarcadero roadway to Beach Street.

From Beach Street, the westbound track would proceed in a transit right-of-way along the Embarcadero roadway and Jefferson Street to Leavenworth Street, as in Alternatives III and IV. The eastbound track would follow a transit right-of-way along Beach, between Leavenworth and the Embarcadero roadway, and would connect with Jefferson via Leavenworth. As with Alternatives III and IV, both tracks would follow Jefferson Street to the single existing track through Aquatic Park and into the existing Fort Mason tunnel to a terminus and turnaround located south of the tunnel's west portal. North of Market Street, E-Line stations, service, and cars would be the same as for Alternatives III and IV.

f. Street and Ramp Modifications

This alternative includes the following street and ramp modifications previously discussed under Alternatives II, III or IV: making Third and Fourth Streets one way south of Market; providing an exclusive, reversible transit lane on Second Street; improving the Main Street ramp from the Embarcadero Freeway; closing Columbus Avenue from Leavenworth to Beach; adding a "bus only" lane from the Bay Bridge to Transbay Terminal; opening Davis from Clay to Washington; constructing a new Embarcadero Freeway off-ramp to Spear and Folsom Streets; and closing Steuart at Howard Streets.

Alternative V includes the following additional street and ramp changes:

- Berry Street would be extended to Seventh Street, closed between Peninsula Commute Service extension and Fourth Street, and made two-way between Second and Fourth Streets to provide access to the Embarcadero roadway.

- King Street would be closed east of sixth street and rebuilt as a one-way service access road between Third and Second Streets.

- Sixth Street would be extended from Townsend to Berry Streets.

- Fifth Street would be closed between King and Berry Streets but extended from Townsend Street, following the Peninsula Commute Service extension alignment, to join Berry Street east of the Sixth Street extension.

- New I-280 Freeway on- and off-ramps would be constructed from the existing freeway stub-end to meet Second Street south of King Street and then join the new Embarcadero roadway. Each ramp would have two through lanes; an eastbound left-turn lane would also be provided at the Second Street intersection.

- A new Embarcadero Freeway on-ramp would start at Howard and the Embarcadero roadway as three lanes and narrow to two to join the remaining freeway structure.

g. Intercept Parking

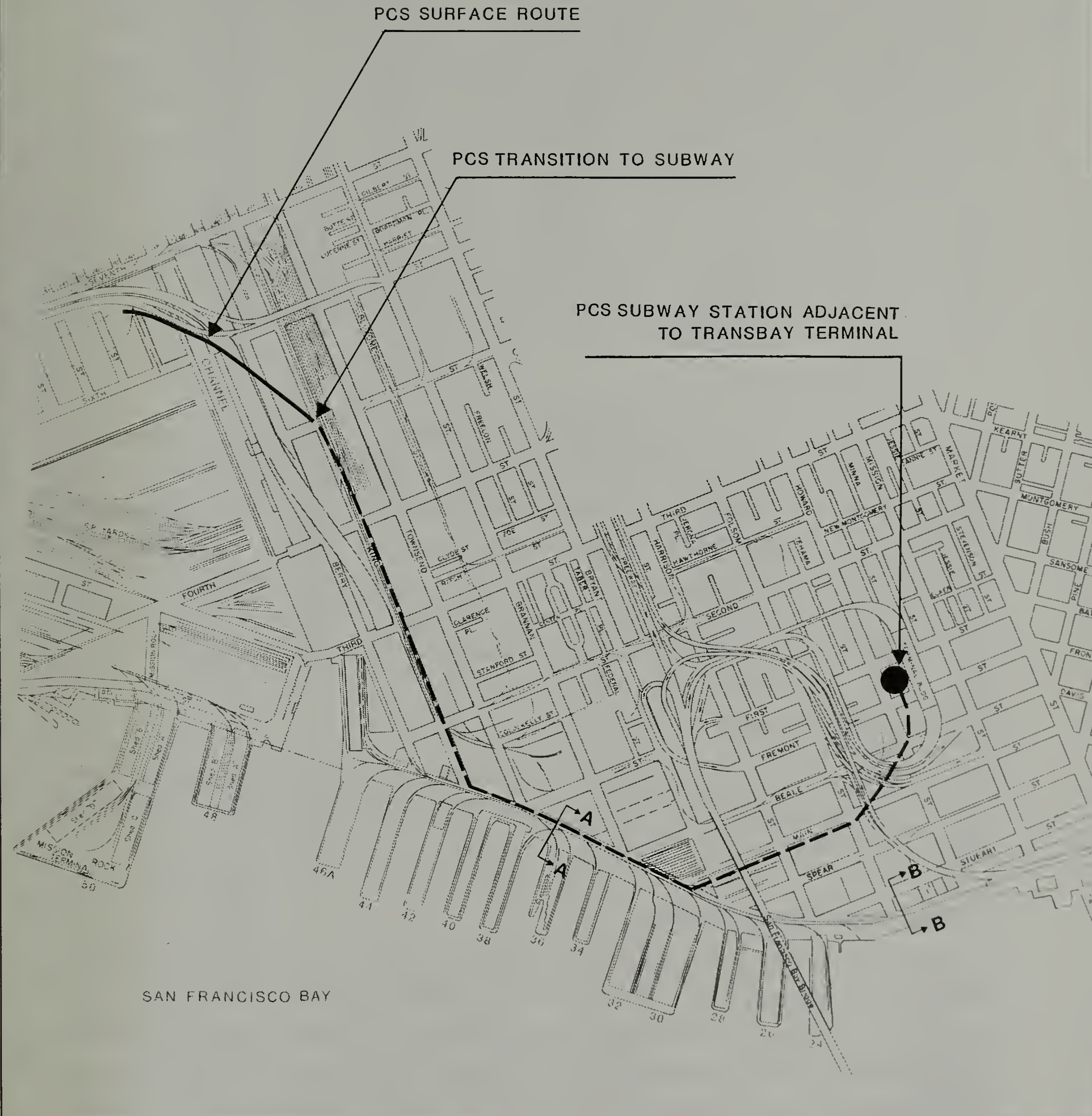
This alternative includes the development of an intercept parking facility beneath the Bay Bridge between Harrison, Main, Bryant, and Beale Streets, as in Alternative IV.

h. TSM Improvement along the Northern Waterfront

As with Alternative IV, TSM improvements under Alternative V would include measures associated with the Embarcadero roadway reconstruction; Muni and street changes described above; making Bay and North Point Streets a one-way couplet between Columbus and Van Ness; adding signal interconnection along the Embarcadero surface road; and measures described under Alternative I.

7. Alternative VA

Alternative VA evolved from Alternative V and includes design options and variations proposed for study by Caltrans, MTC and the City of San Francisco. The major differences are that in Alternative VA the Peninsual Commute Service extension would be a subway line and the terminal subway station site would be relocated to the Transbay Terminal (see Figure III-20).



ALTERNATIVE VA: PROPOSED PCS EXTENSION ROUTE

III-20

Both Alternative V and Alternative VA emphasize measures to mitigate the transportation impacts of demolishing the Embarcadero Freeway. Alternative VA includes addition of I-280 on- and off-ramps at Second and King Streets; removal of the Embarcadero Freeway from Beale Street to Broadway and the addition of off- and on-ramps for I-80 traffic from the remaining segment of the viaduct; reconstruction of the Embarcadero roadway from four to six lanes; extension of the Peninsula Commute Service tracks in a subway to a station at the Transbay Terminal; extension of Muni Metro rail lines from the Embarcadero Station to the existing SP Depot; provision of E-Line streetcar service between Fort Mason and the F-Line interface; and provision of street and ramp modifications, intercept parking and TSM improvements in the study area.

a. I-280 Touch-Down

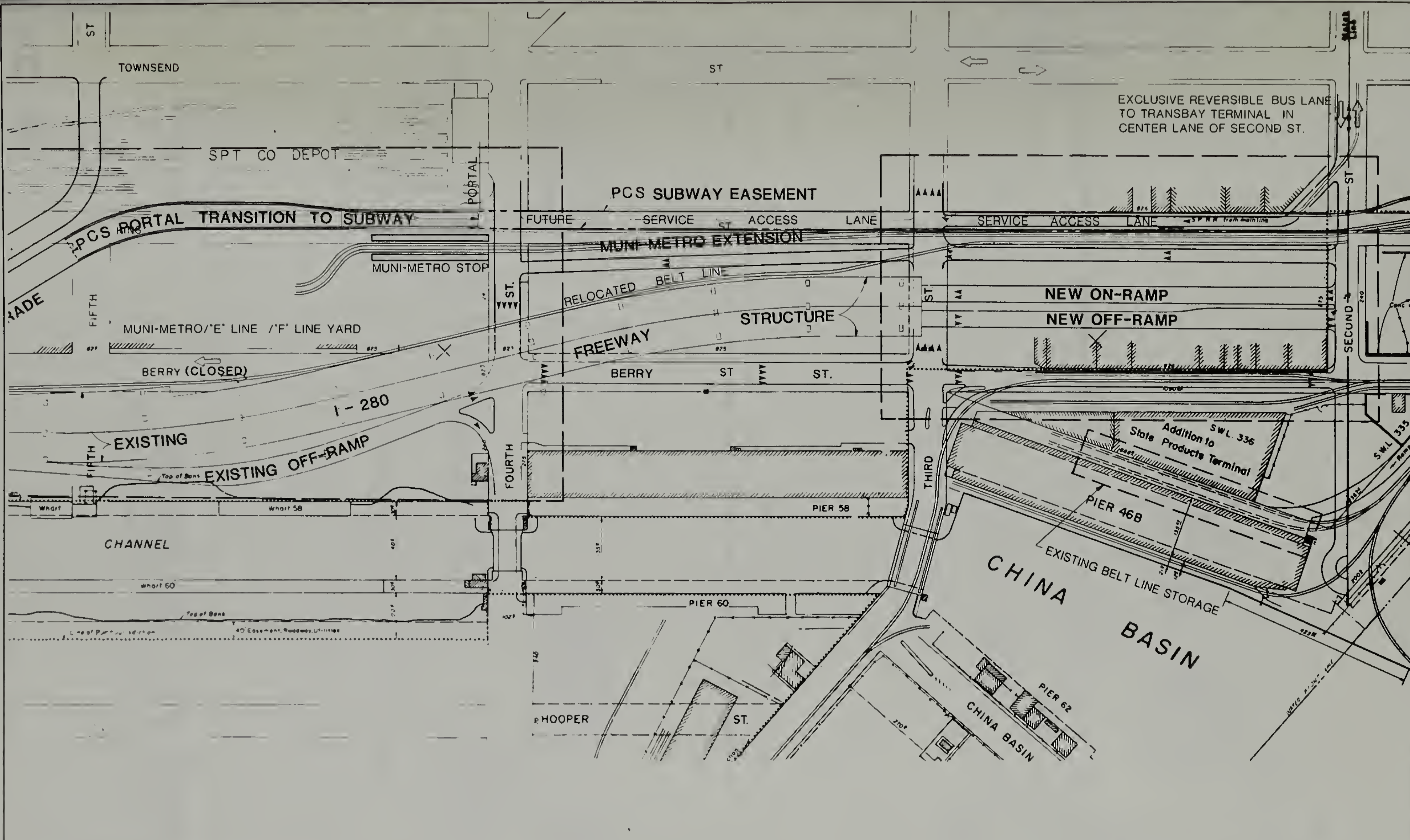
As in Alternative V, the existing I-280 Freeway structure and eastbound off-ramp to Fourth Street would remain and new on- and off-ramps would extend from Second Street, mid-block between King and Berry Streets, to the existing stub-end of the freeway at Third Street (see Figure III-21). A more northerly alignment of the ramps would have lesser impact on proposed park land to the south, but it could reduce traffic quality due to combined horizontal and vertical curvature constraints. However, a more northerly touch-down location for the ramps should be investigated in preliminary design.

b. Embarcadero Freeway

As in Alternatives IVA and V, the Embarcadero Freeway would be removed from Broadway to west of Beale Street and new on- and off-ramps would be added to remaining portions of the upper and lower decks.

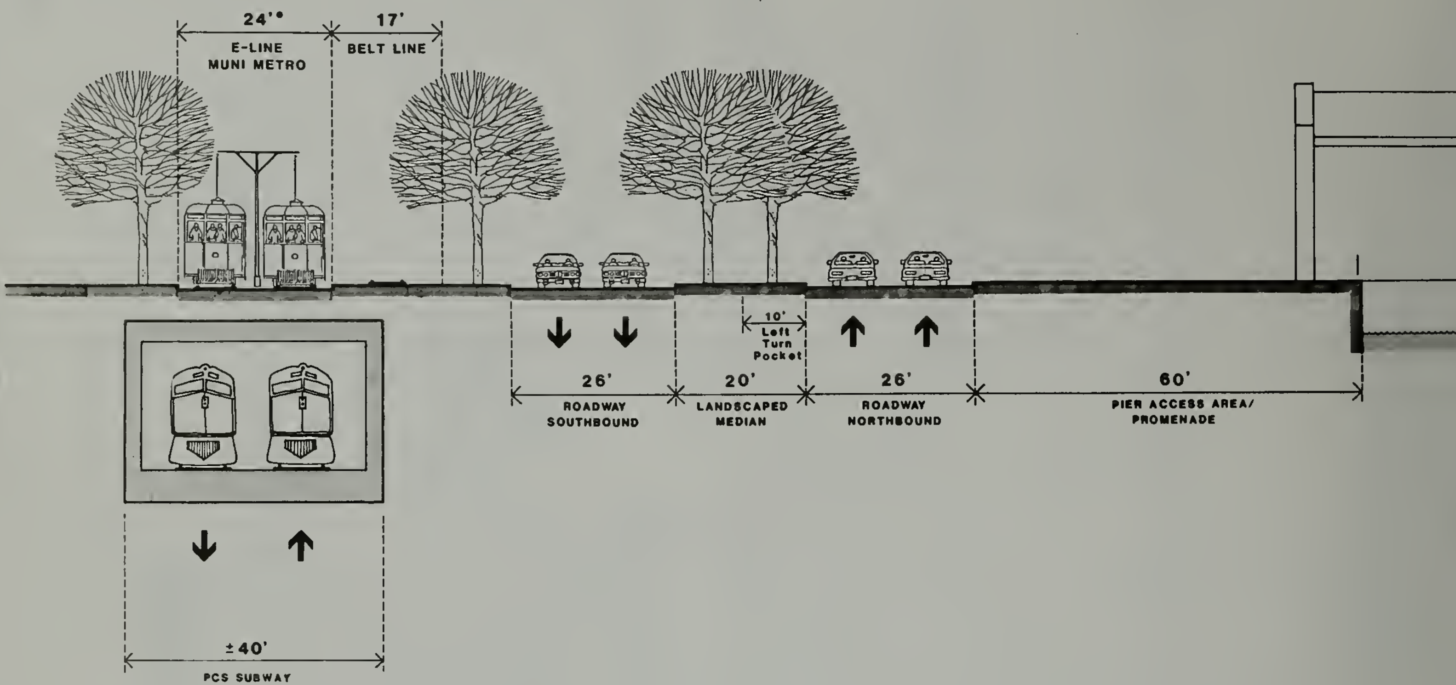
c. Embarcadero Surface Roadway

In the China Basin segment, the Embarcadero surface roadway would connect to the new I-280 on- and off-ramps that meet grade on the west side of Second Street, as in Alternative V. Because the Peninsula Commute Service extension would be a subway under King Street from Fourth Street to the Transbay Terminal, King Street right-of-way would be used for service access and the Muni Metro extension tracks and a new two-lane one-way roadway constructed south of the Muni Metro tracks. Berry Street would provide four eastbound lanes from Fourth to Third, dropping to two lanes between Third and Second Streets. One westbound lane between Second and Third Streets would allow right-turn access to Third Street.

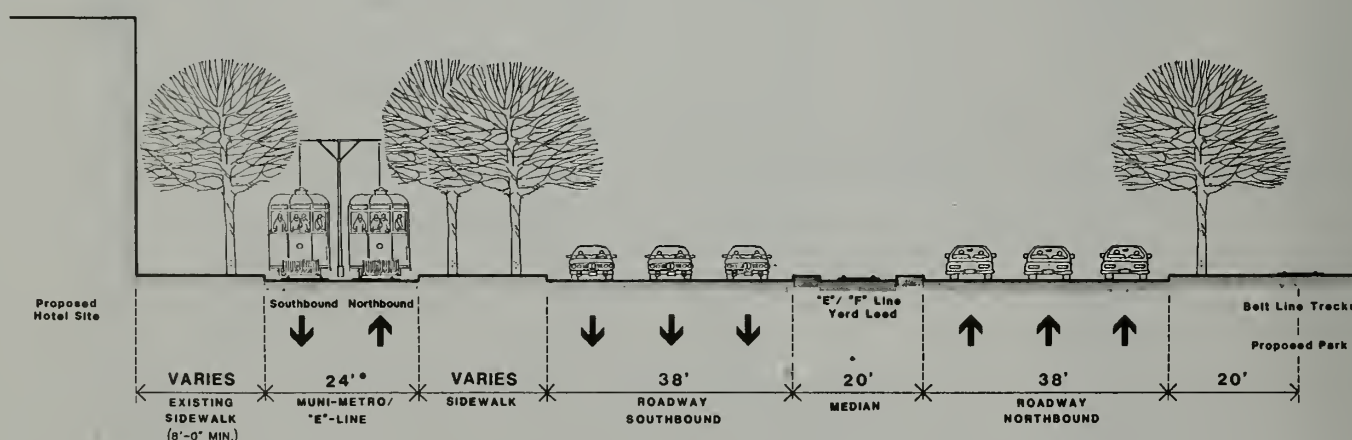


ALTERNATIVE VA:
ENLARGEMENT OF CHINA BASIN SEGMENT

III-21



A. Embarcadero Roadway in South Beach/Rincon Hill Segment.



B. Embarcadero Roadway near Folsom Street.

ALTERNATIVE VA: SECTIONS

(See Figure III-20 for locations of Sections)

SCALE 0 5 10 30 FEET

III-22

In the South Beach/Rincon Hill segment, the Embarcadero roadway would contain four lanes and a 20-foot landscaped median between Second and Bryant Streets. Left-turn pockets would be cut into the median (see Figure III-22). The roadway would widen to five lanes north of Bryant (three southbound and two northbound lanes) and then to six lanes north of Harrison Street. As in Alternatives II, III, and IV the roadway would be set back from the waterfront by 60 feet.

Turn lanes from the Embarcadero roadway would be provided at Brannan, Bryant, Beale and Harrison Streets. As in Alternatives II, III, IV, and V, Townsend, First Street, and the existing Brannan Street would be closed at The Embarcadero roadway. Brannan Street would be realigned to connect with The Embarcadero at 90 degrees. Beale Street would be kept open between Bryant and The Embarcadero roadway as it is in Alternative IV, while Bryant Street would connect the Embarcadero in an alignment similar to Alternatives II, III and IV, but not as a bridge as in Alternative V. Main Street could be returned to through traffic between Harrison and Bryant Streets after construction because the Peninsula Commute Service would be underground.

Within and north of the Ferry Building segment the Embarcadero roadway and intersections would be the same as in Alternative V except for the closure of Mission Street at The Embarcadero. In the Ferry Building area, the roadway would be six lanes wide. North of Mission Street, the median would increase in width to 50 feet for the E-Line. The roadway would have turn lanes at Howard, Washington and Mission Streets, and Broadway. Two 400-foot-long drop-off and parking bays would be provided at the Ferry Building complex.

North of Broadway, between Piers 9 and 35 the roadway would narrow to four lanes. Between Broadway and Bay Street the 102-foot right-of-way would contain a 50-foot median with the E-Line/Belt Line tracks and landscaping. North of Bay Street, removal of the landscaping would reduce the road right-of-way to 76 feet, but as in Alternatives III-V, additional portions of the sidewalk near Pier 39, Seawall Lot 314 and Grant Avenue would be required. Access to the Embarcadero roadway would be maintained at Union, Battery, Lombard, Sansome, Bay, and North Point Streets. The roadway would be set back from the bulkhead line between 30 feet and 45 feet as in the other alternatives.

In the Fisherman's Wharf and Fort Mason/Aquatic Park segments, the street and traffic system would be identical to the system described in Alternatives III, IV, and V.

As in Alternative V, the Belt Line would share the proposed Peninsula Commute Service extension right-of-way to Berry Street where it would parallel and run just north of the I-280 freeway but south of the Muni Metro extension. It would parallel the east side of the Muni Metro extension tracks to Harrison Street, where the Belt Line would cross the Embarcadero roadway and would follow an alignment along the edge of the park as far as Howard Street. At Howard Street, it would cross the northbound lanes of the roadway and merge with the E-Line/F-Line yard lead in the median. The Belt Line would remain in the median and share the westbound E-Line track from the Ferry Building to Pier 35, where Belt Line service terminates. Currently active Belt Line access to piers would be maintained.

d. Muni Metro/Peninsula Commute Service Extension

As described above, the major difference between Alternative V and Alternative VA is the change in the Peninsula Commute Service extension from an at-grade line/subway station to a virtually complete subway line and station alignment. Alternative VA proposes extending the Muni Metro from the existing Embarcadero Station to the location of the existing SP Depot at Fourth and Townsend and extending the Peninsula Commuter Service to a station adjacent to the Transbay Terminal in downtown San Francisco.

A Muni storage yard would be located west of Fourth Street as described in Alternative V. From the yard, the Muni Metro tracks would run north and then in the center of existing King Street to Second Street. A station would be located just west of Fourth Street. North of Second Street the Metro and Belt Line tracks would parallel the Embarcadero roadway to Harrison Street with a station near Townsend Street. From Harrison the Muni Metro would continue in Steuart Street and then descend into the subway just south of Howard Street and connect to a turnback at the east end of the Embarcadero Station, as in Alternative V. A subway station would be located north of Howard Street. Proposed service would be the same as described in Alternatives III, IV, IVA and V.

The Peninsula Commute Service extension would primarily be a subway with a downtown terminal adjacent to the Transbay Terminal.[2] The tracks would cross China Basin on a trestle and proceed under the I-280 Freeway structure, cross Berry Street, and descend to a subway portal just west of Fourth Street, adjacent to the proposed Muni Metro Station.

As in Alternative V, the existing SP Depot and tracks are assumed to be relocated to a new location in the China Basin. Possible stop location would be west of Sixth or east of Third Street. The alignment would run under King Street to Second Street. East of Second Street the subway would lie beneath the Muni Metro/Belt Line tracks. After Beale Street the subway would turn away from the Embarcadero roadway, increase from two to three tracks, cross under Bryant and parallel Main Street almost to Folsom Street. At Folsom two tracks would turn west, parallel to and just north of Howard Street, and terminate as a six-track underground station adjacent to the Transbay Terminal between Beale and Second Streets. Six platforms would be provided for train loading and unloading. Assumptions about equipment type and service level for Peninsula Commute Service extension are as described in Alternative V.

While technically feasible, the subway alignment described above would be expensive to construct because of undesirable soil conditions and potential conflicts with major existing utilities. It could also have short-term, as well as long-term, impacts on the proposed housing development in the South Beach sub-area of the Redevelopment project. Therefore, although not examined in detail in the I-280 study, alternative alignments and terminal locations for the proposed extension should be investigated further should this project be advanced for further development.

e. Muni E-Line

The Muni E-Line in this alternative would be a rail service along The Embarcadero from Fort Mason to a proposed F-Line connection at Market Street. South of Market Street the E-Line/F-Line yard lead would connect with the Muni Metro track at Folsom Street; north of Market the E-Line would lie in the median of the Embarcadero roadway to Beach Street. From Beach Street the northbound tracks would proceed in the median to Powell Street and then westbound along Jefferson to Hyde Street. Eastbound tracks would follow Beach, Hyde and Jefferson Streets. As with Alternatives III, IV, and V existing parking along Jefferson and Beach would be eliminated. West of Hyde the tracks would follow Jefferson Street and merge into the single existing track through Aquatic Park to Fort Mason. The terminus at Fort Mason would be the same as in Alternatives III, IV, IVA, and V.

North of the E-Line/F-Line interface, E-Line stations and service would be as described in Alternatives III, IV and V. Between the E-Line/F-Line interface and Fort Mason, stations would be located at Broadway and Lombard, Beach, Taylor and Hyde Streets.

f. Street and Ramp Modifications

Street and ramp modifications under Alternative VA would be the same as in Alternative V except for the following changes to King, Berry, and Mission Streets:

- Berry Street would be one-way eastbound between Third and Fourth Streets and two-way between Third and Second Streets carrying one lane westbound for right turns on Third and two lanes eastbound, providing King Street with access to the Embarcadero surface road at Second Street.

- King Street would be rebuilt south of Muni Metro extension tracks as a two-lane westbound street between Fourth and Second Streets. A one-way service access roadway would be provided between Second and Third Streets on the north side of the Muni Metro tracks.

- Mission Street would be closed between Spear and Steuart Streets and between Steuart Street and the Embarcadero roadway to conform with the City of San Francisco Master Plan.

g. Intercept Parking

Alternatives V and VA both include the development of an intercept parking facility beneath the Bay Bridge in an area bounded by Harrison, Main, Bryant, and Beale Streets.

h. TSM Improvements along the Northern Waterfront

TSM improvements would be identical to those for Alternative V, including relocation and modification of existing signals along The Embarcadero as a result of the roadway reconstruction; a one-way couplet at Bay and North Point Streets between Van Ness and Columbus Avenues; signal interconnection along The Embarcadero; and the TSM improvements included in Alternative I.

8. Alternative VI

Alternative VI would retain the already-constructed segment of the Embarcadero Freeway and seek to provide improved public transportation in the Embarcadero Corridor. This alternative would provide both an entry and an exit ramp for I-280 in the vicinity of Second and King Streets; maintain the Embarcadero Freeway essentially as is, with the addition of low-cost features to improve its appearance; reconstruct the Embarcadero surface roadway to four lanes throughout its length and improve surface level traffic and pedestrian/bicycle flows parallel to and beneath the freeway structure; provide an underground Muni Metro turnback facility at the Embarcadero Station to enhance

operating efficiency; extend Peninsula Commute Service to a new downtown station at Rincon Annex as proposed by Caltrans, but without including the Muni Metro service extension; provide Muni E-Line streetcar service along the Embarcadero from Fort Mason to the SP Depot; and provide street and ramp improvements, intercept parking, and TSM improvements in the study area (see Figure III-23).

a. I-280 Touch-Down

The existing freeway structure and off-ramp to Fourth Street would remain and, as with Alternative V, new two-lane on- and off-ramps would extend from Second Street to the stub-end at Third Street. The freeway end would be modified with striping, markings, curbs, and barricades to transition traffic between ramps and the freeway.

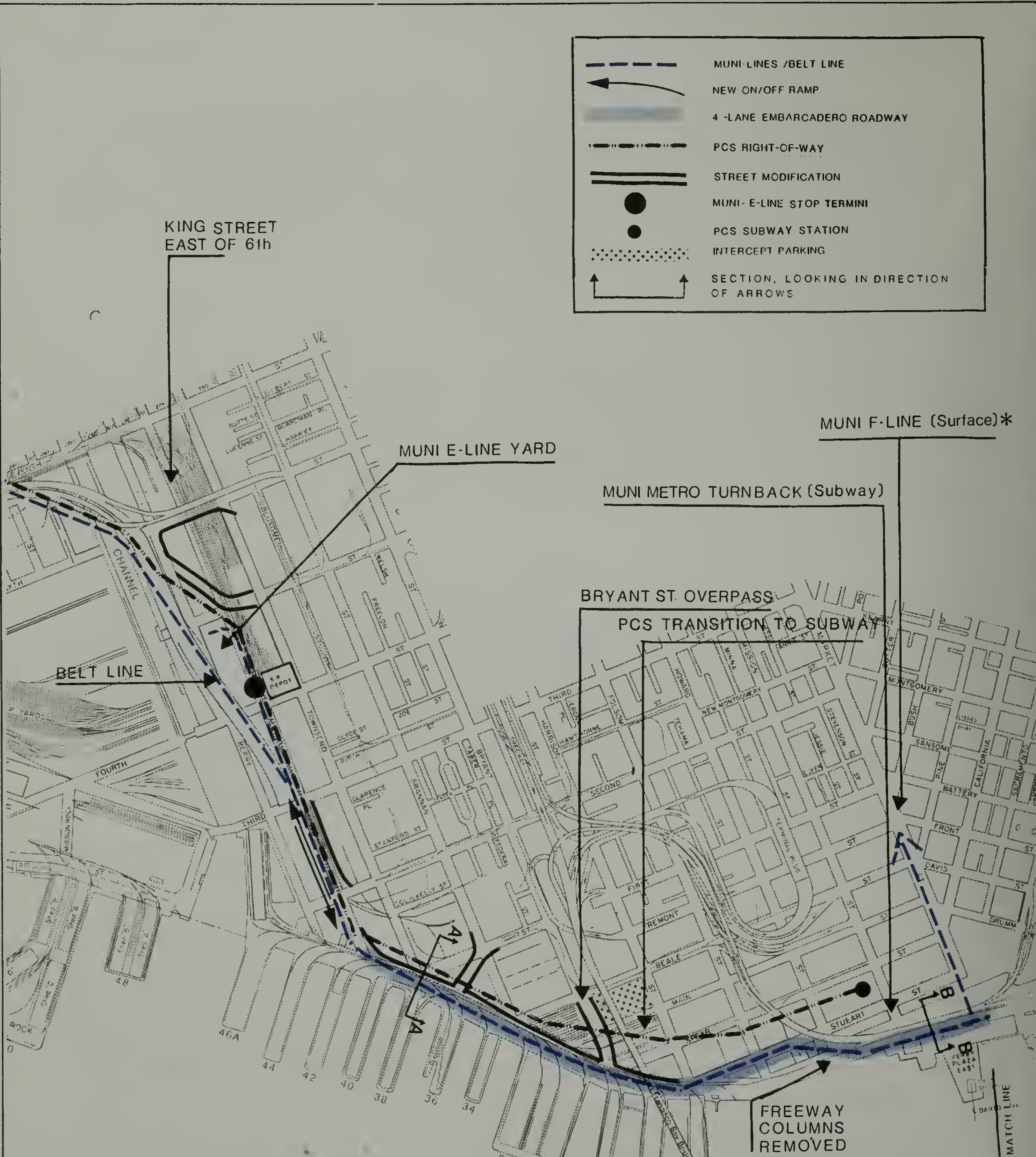
b. Embarcadero Freeway

The Embarcadero Freeway would be maintained essentially as is. Some changes, such as landscaping associated with roadway improvements, would improve its appearance, but the existing freeway and ramps would remain. In order to eliminate conflicts with northbound lanes of the Embarcadero surface roadway, six easterly columns of the Embarcadero Freeway near Howard Street would be removed and the affected portions of the freeway structure reconstructed. Alternately, the surface road could be aligned to clear the columns, but this would encroach on Ferry Building rights-of-way and the Embarcadero promenade.

c. Embarcadero Surface Road

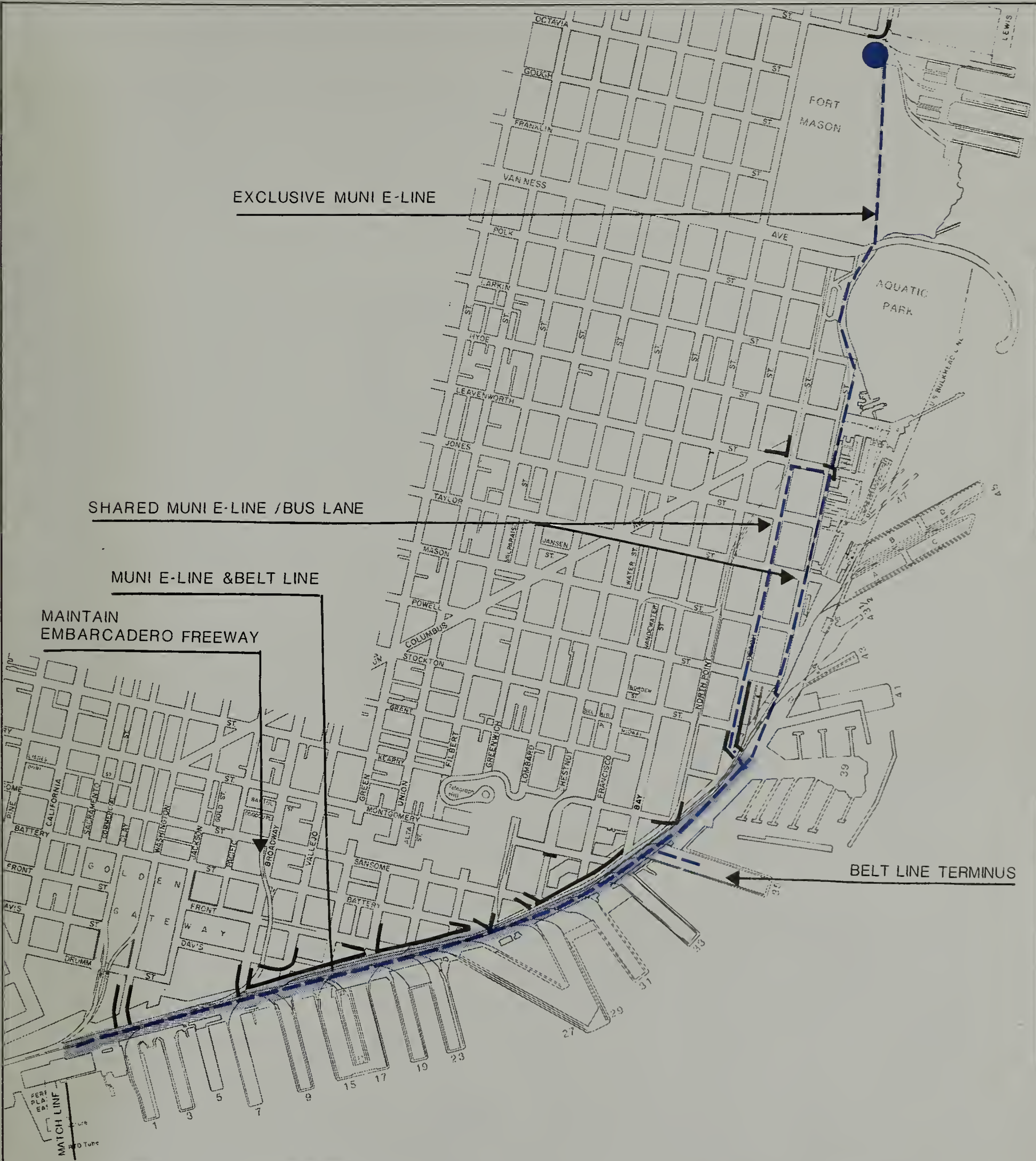
In the China Basin segment, the roadway would connect to the new I-280 on- and off-ramps near Second Street between King and Berry Streets, as in Alternative V. King Street would be closed east of Sixth Street, but a 40-foot right-of-way between Second and Third Streets would be used as an access road. Berry Street between Second and Fourth Streets would be made two-way to provide access between Third or Fourth Street and the Embarcadero surface road.

In the South Beach/Rincon Hill segment, the four-lane roadway would include a 20-foot landscaped median and left-turn pockets as in Alternative V. As in Alternatives II, III, IV, and V, a 60-foot setback would provide pier access and recreational improvements along the waterfront (see Figure III-24).



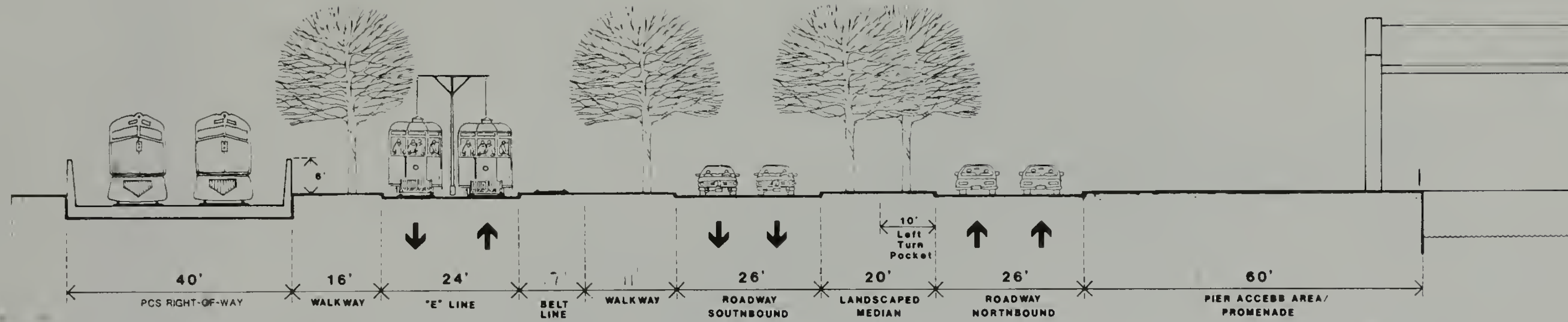
ALTERNATIVE VI

* NOTE: PROPOSED F-LINE NOT PART OF I-280 TCP STUDY

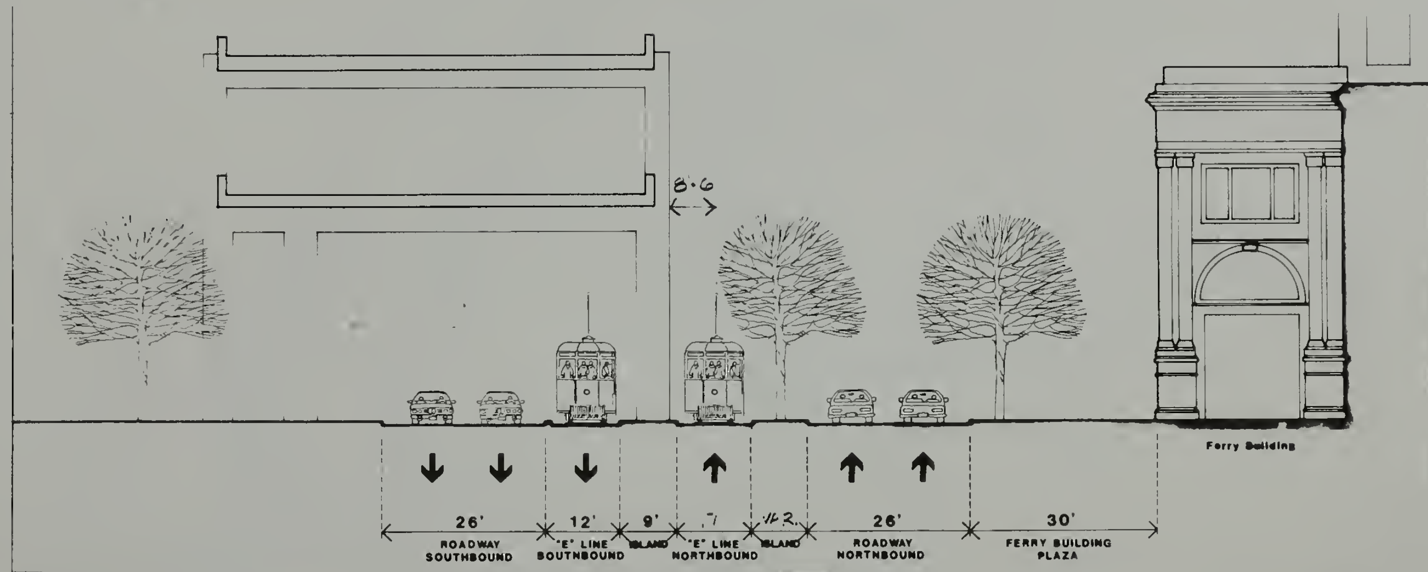


III-23

ALTERNATIVE VI



A. Embarcadero Roadway near Pier 38, Looking North



B. Embarcadero Roadway at Ferry Building, Looking North

ALTERNATIVE VI: SECTIONS

(See Figure III-23 for specific locations)

SCALE 0 5 10 30 FEET

III-24

Access would be maintained at Second, Brannan, Bryant, and Harrison Streets. As in Alternatives II, III, IV, and V, Townsend and First Streets would be closed to The Embarcadero, and Brannan Street would be realigned. The proposed Peninsula Commute Service extension to downtown would close portions of Beale and Main Streets; Bryant Street would bridge over the Peninsula Commute Service line.

In the Ferry Building area, the roadway would be four lanes and the median would widen to between 36 and 60 feet in width to accommodate the E-Line and to allow roadway alignment adjacent to and beneath the Embarcadero Freeway (see Figure III-24). The two northbound lanes would lie east of the freeway, while the southbound lanes would run beneath it; columns would be located in the median. Northbound left-turn lanes would be maintained at Harrison, Howard, Mission, and Washington Streets and Broadway; southbound lanes have right turns at Broadway, Washington, Mission, Howard and Harrison Streets. A 400-foot parking and drop-off bay would be located adjacent to the Ferry Building complex, and U-turns for southbound traffic would be possible at Mission Street.

Through Piers 9 - 35, a 50-foot median would accommodate the E-Line/Belt Line tracks and would be landscaped as far as Bay Street. North of Bay Street, landscaping would be removed from the median to reduce roadway width but, as with Alternatives IV and V, this would still necessitate taking portions of sidewalks from Pier 39, Seawall Lot 314, and Grant Avenue. Access would occur at Broadway, Union, Battery, Sansome, Lombard, and Bay Streets. Under this alternative, a 30-foot and 45-foot setback from the bulkhead line would provide pier access and recreational improvements along the waterfront.

In the Fisherman's Wharf area, the Embarcadero roadway would connect to the existing four-lane roadway. Beach Street would be modified to create a perpendicular connection, as with other Alternatives, but no other street changes in this area are proposed. Along the Fort Mason/Aquatic Park segment, the street and traffic system would be identical to that described in Alternatives III, IV, and V.

The Belt Line would follow the alignment described under Alternative V in which Peninsula Commute Service, Muni Metro, or existing tracks would be used. Currently active pier access would be maintained or restored.

d. Muni Metro/Peninsula Commute Service Extension

Under this alternative, the Muni Metro line would not be extended to the existing SP Depot, although provisions would be made for its future extension and an underground turnback facility would be provided at the Embarcadero Station as in Alternative II.

This alternative includes a Peninsula Commute Service extension to Rincon Annex. An at-grade two-track line, with a 35- to 45-foot right-of-way, would extend from China Basin and along the waterfront to a subway north of the Bay Bridge, and then to an underground station at Rincon Annex, as described in Alternative V. Assumed station location, service, and equipment would be identical to those described for Alternative V.

e. Muni E-Line

This alternative includes a Muni E-Line rail service from Fort Mason to the existing SP Depot at Fourth and Townsend.

Tracks would connect to an E-Line/F-Line yard between Fifth, Berry, Fourth, and King Streets. A station would be on the southwest corner of the Fourth and King Street intersection. East of the station, the E-Line would run parallel to the Peninsula Commute Service extension.

Past Second Street, the E-Line would run between the Peninsula Commute Service extension and the Embarcadero roadway. North of Howard Street, it would connect to the landscaped median of The Embarcadero, under the freeway structure, where it would remain as far as Beach Street. At the foot of Market Street, the proposed F-Line would connect with E-Line in the roadway median.

From Beach Street, the alignment would be identical to Alternatives III, IV, and V. The westbound track would follow the median to Jefferson Street and then to Leavenworth. The eastbound track would run on Beach between Leavenworth and The Embarcadero and would connect with Jefferson via Leavenworth. West of Leavenworth, both tracks would follow the Jefferson Street right-of-way and merge into the single existing track through Aquatic Park and the Fort Mason tunnel to a terminus and turnaround south of the tunnel's west portal.

Stops, frequency of service, and types of cars that could be used would be as described for Alternatives III, IV, and V.

f. Street and Ramp Modifications

All of the street and ramp modifications proposed for this alternative were discussed under Alternatives II, III, IV, or V. They can be summarized as follows: making Third and Fourth Streets one way south of Market where they are already not so; providing an exclusive, reversible transit lane on Second Street; extending Berry, Fifth, and Sixth Streets near the existing SP yard area; rebuilding a portion of King Street as a service access road; making Berry Street two-way between Second and Fourth Streets; constructing two new I-280 ramps between Second Street and the stub-end; and closing Columbus from Leavenworth to Beach.

g. Intercept Parking

This alternative includes the development of an intercept parking facility beneath the Bay Bridge in an area bounded by Harrison, Main, Bryant, and Beale Streets, as in Alternatives IV and V.

h. TSM Improvement along the Northern Waterfront

As with Alternatives IV and V, Alternative VI TSM improvements would include those associated with the Embarcadero roadway reconstruction, Muni E-Line and street changes described above; making Bay and North Point Streets a one-way couplet between Columbus and Van Ness; adding signal interconnection along the Embarcadero surface road; and measures included in Alternative I.

---

[1]Sverdrop/Foster, Design Report for a Track Extension and Turnaround, September 1978.

[2]Barton-Aschmann Associates, San Francisco Commuter Rail Terminal Relocation Study, draft report, October 1982.

IV. ENVIRONMENTAL SETTING

INTRODUCTION

This chapter describes features of the transportation, social, economic and natural environment for the area potentially affected by the I-280 TCP alternatives. The existing conditions described in this chapter establish a baseline to use in discussing the location and extent of potential impacts described in subsequent chapters.

The study area analyzed in each section varies according to the probable extent of impacts and the level of detail required in the impact analysis. The Social, Economic and Transportation setting sections, for example, include citywide or regional data. This is because the project would not only have direct effects in the corridor with respect to these issues, but also indirect effects which would affect the larger areas. It is also noted that the terms study area and project corridor are often used interchangeably. Any references to either the study area or project corridor should be understood to imply the study area as defined for that topic (e.g. land use, social, economics).

A. SOCIAL AND COMMUNITY ENVIRONMENT

1. Existing Land Use Patterns and Development Trends

a. Overview

The proposed project would extend through at least nine identifiable subareas between China Basin on the south to Aquatic Park on the north. They include China Basin, the South Beach warehouse district, Rincon Point, Rincon Hill, the Ferry Building area, the Golden Gateway Redevelopment area and adjacent piers, Piers 9-35 and adjacent areas, Fisherman's Wharf, and Aquatic Park and Fort Mason (refer to Figure III-1).

For purposes of clarity, the land use discussion which follows is broken into two major subsections. The four subareas south of Market Street are discussed as a unit because the geographical layout and current dynamic development trend unify the South of Market area and distinguish it from the districts north of Market Street. The five subareas north

of Market Street are more distinctive and less functionally integrated than the South of Market areas, but will be grouped together in subsection c. below for convenience. Portions of the Ferry Building area are discussed in each section.

The land use study area (or project corridor) in this discussion refers to an area extending roughly two blocks on either side of the corridor containing the TCP elements. A relatively small study area was selected because land use impacts for a project such as the Transfer Concept Program generally occur within close proximity to transportation improvements.

The following land use discussion addresses existing land uses (see Figures IV-1, IV-2 and IV-3), the trends in land use transition, and the relationship of the trends to transportation projects. Zoning and height and bulk designations are important facets of the land use regulatory setting in which these transitions will occur. The zoning and height and bulk district boundaries are shown in Figures IV-4 and IV-5.

Zoning in the South of Market area is generally organized as a series of bands parallel to Market Street, moving from heavy industrial uses in the China Basin area to commercial uses along Market and Mission Streets (Figure IV-4). Within the project corridor, the Embarcadero and pier areas are limited to 40-foot heights from China Basin north to Pier 26, while heights of 84 feet are allowable from Pier 24 northward (Figure IV-5). Industrial-zoned areas are generally allowed heights of 105 feet. Height and bulk districts generally increase in allowable intensity moving northward within the South of Market area, with heights of up to 320 feet allowed in the Office Support zone, 500 feet along the southern frontage of Mission Street, and 600 feet between Market, Mission, Beale and Main Streets.

North of Market Street most of the project area is zoned for commercial uses. The exceptions are industrial zoning for Piers 9-35, residential and mixed use zoning for the Golden Gateway and the foot of Telegraph Hill, and public use zoning at Fort Mason, Aquatic Park, and for four blocks in the vicinity of Pier 39. Height and bulk designations within the corridor decline from 84 feet (84-X and 84-J) at and near the Ferry Building to 40 feet from Pier 9 to Aquatic Park. Most of Fort Mason, Aquatic Park, and the various plazas and parks within the corridor are designated as open space (OS).

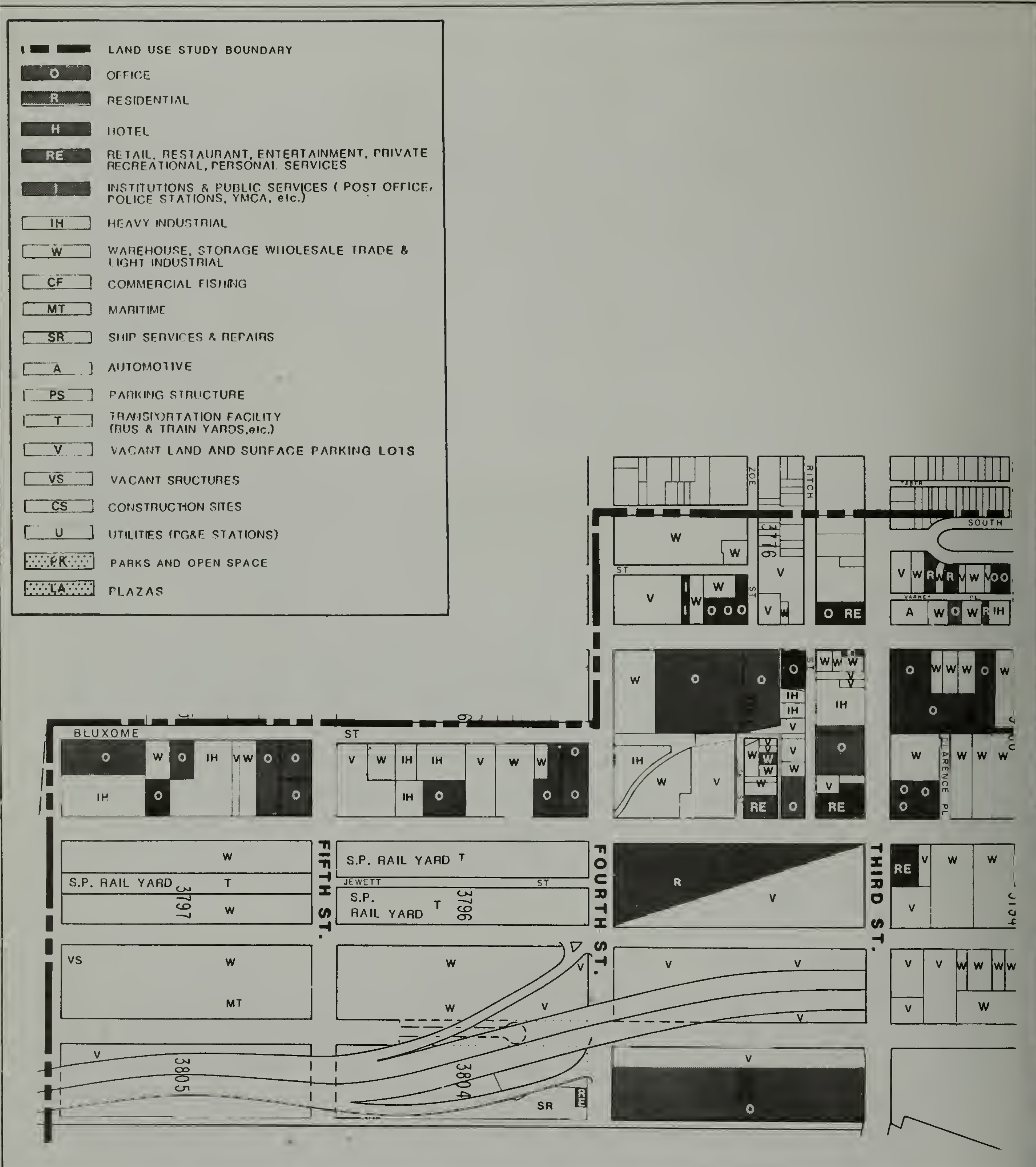
b. South of Market Area

Market Street is the break between the regular pattern of small, square blocks arranged in a north-south grid of the northeastern quadrant of the City and the South of Market corridors of long blocks running southwest-northeast. Whereas the business district is scaled to pedestrian movement, the South of Market blocks are oriented to the movement and assembly of goods between the waterfront and rail and road corridors moving across the former Bay flats toward the center of the City and down the Peninsula. The South of Market area includes several subareas linked by geographical and functional history, including China Basin, the South Beach warehouse district, Rincon Hill, and Rincon Point. Existing uses in this area are shown in Figures IV-1 and IV-2.

<u>Existing Land Uses</u>. Land uses range from heavy industrial uses at the southern edge to prime office space near the Ferry Building. The China Basin area is dominated by the 60-acre Southern Pacific rail yards and terminal bounded by Sixth, Fourth, Townsend and King Streets. Industrial uses in this area are mostly break-bulk, warehousing, distributing and storage businesses. While this subarea has the largest concentration of viable industrial uses within the study area, there are also many vacant structures and lots. Immediately west of China Basin is the Showplace area, marked by the conversion of old warehouses and factories to design showrooms. The China Basin Building on Berry Street east of Fourth Street has been converted from warehousing to modern office and retail space. Other uses within the China Basin area include a recreational vehicle park and a stretch of boats and houseboats along Mission Creek. At the northeast corner of the area South Park combines many workshop and retail ground floor uses in addition to providing housing for several hundred people.

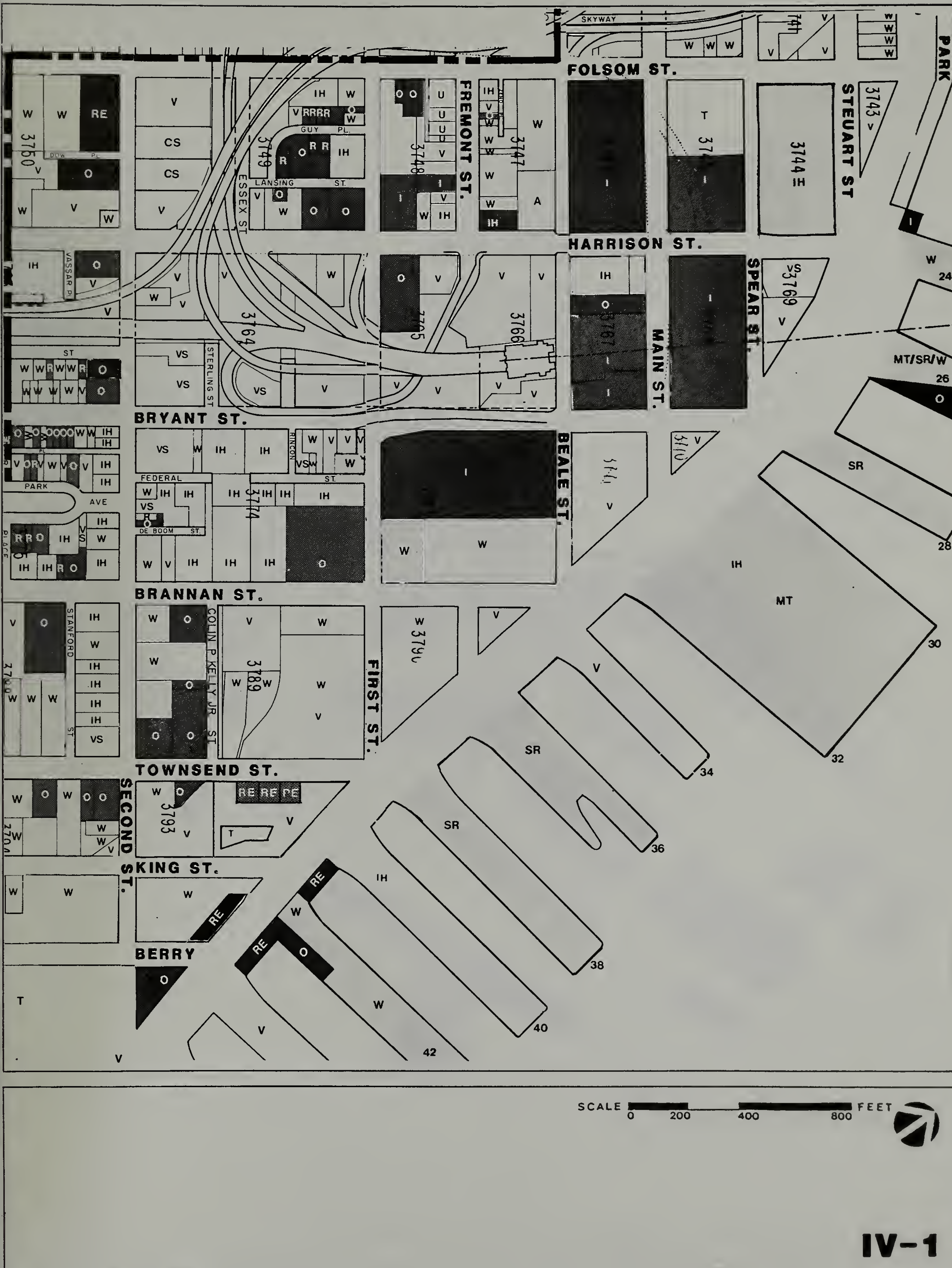
The South Beach warehouse district is bounded roughly by Second Street, Bryant Street and the Embarcadero roadway, including Piers 40-46A. All of these piers are in poor condition; Pier 44 and half of Pier 46A have been abandoned. The area includes vacant lots some of which are used for surface parking lots, and several nineteenth-century brick warehouses, some of which may be eligible for the National Register of Historic Places. For more detail on historical issues see Chapter VI, Historic and Archaeological Resources and Parkland, of this report.

Between South Beach and the Bay Bridge most of the piers are in poor condition. Piers 14, 18, 20 and 22 were condemned and demolished as part of the Waterfront Promenade



LAND USE MAP A

SOURCE: SAN FRANCISCO DEPARTMENT OF CITY PLANNING SURVEYS, 1981-1982, EIP CHECKS, SEPTEMBER, 1983

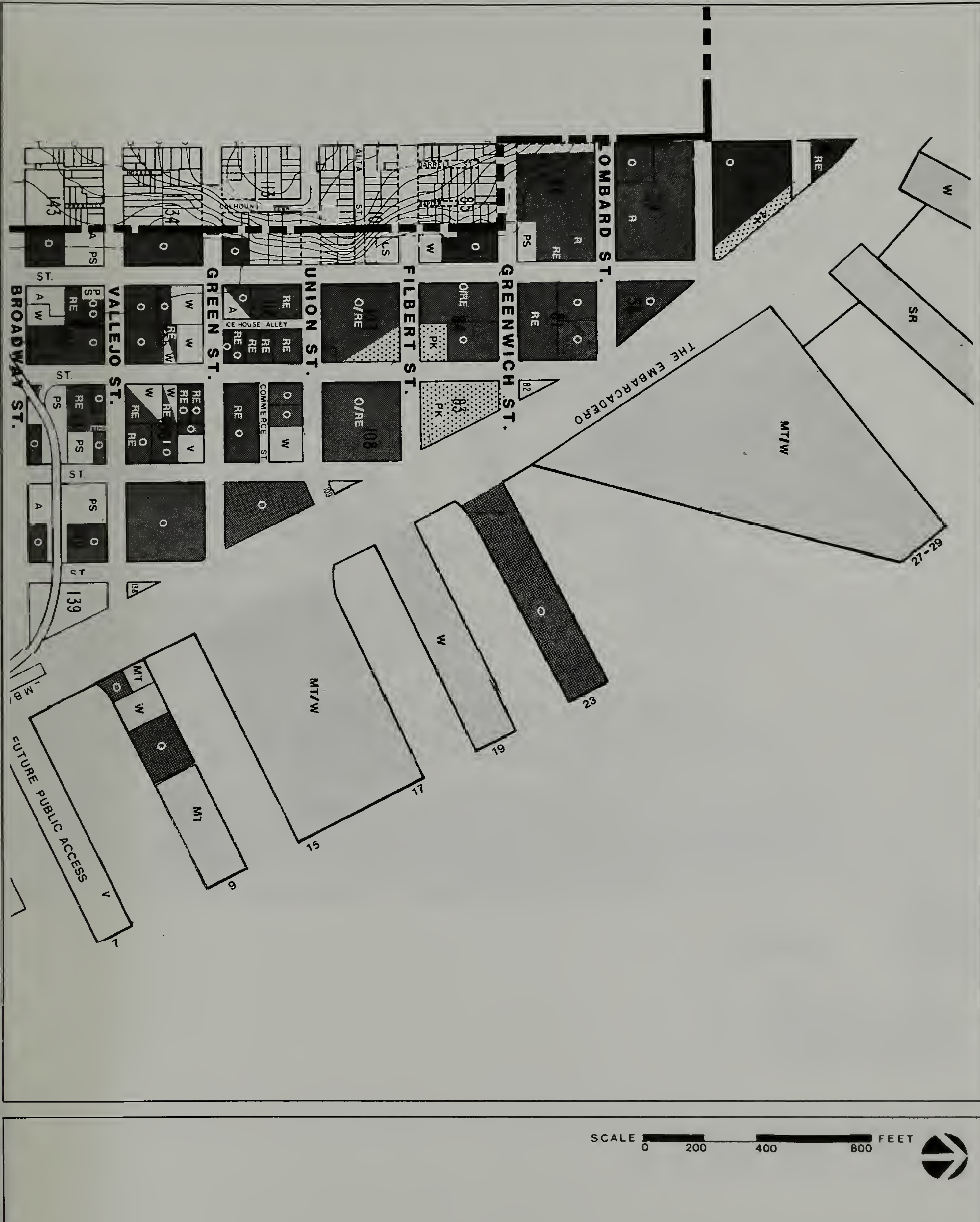


IV-1

LAND USE MAP A

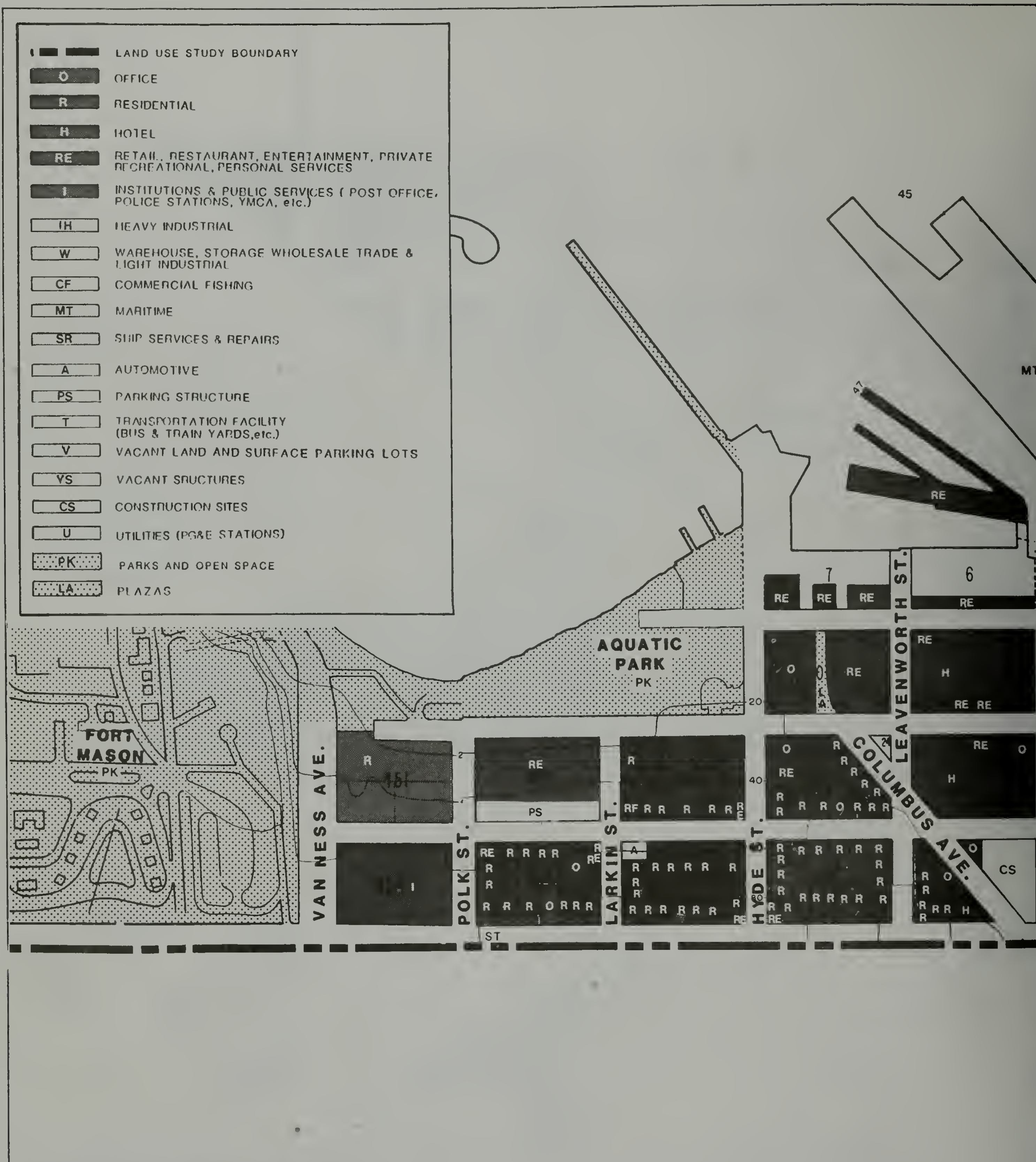
LAND USE MAP B

SOURCE: SAN FRANCISCO DEPARTMENT OF CITY PLANNING SURVEYS, 1981-1982, EIP CHECKS, SEPTEMBER, 1983



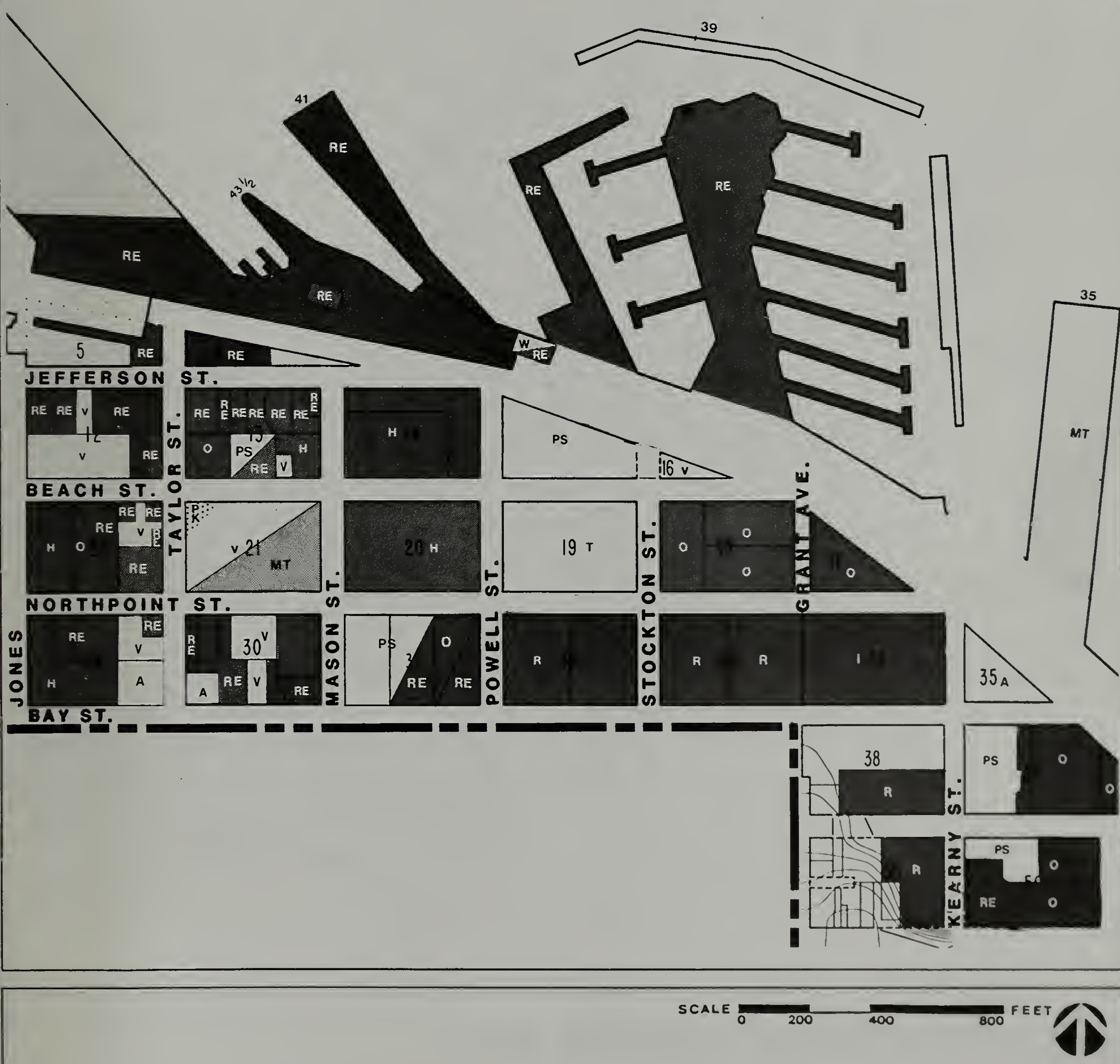
IV-2

LAND USE MAP B



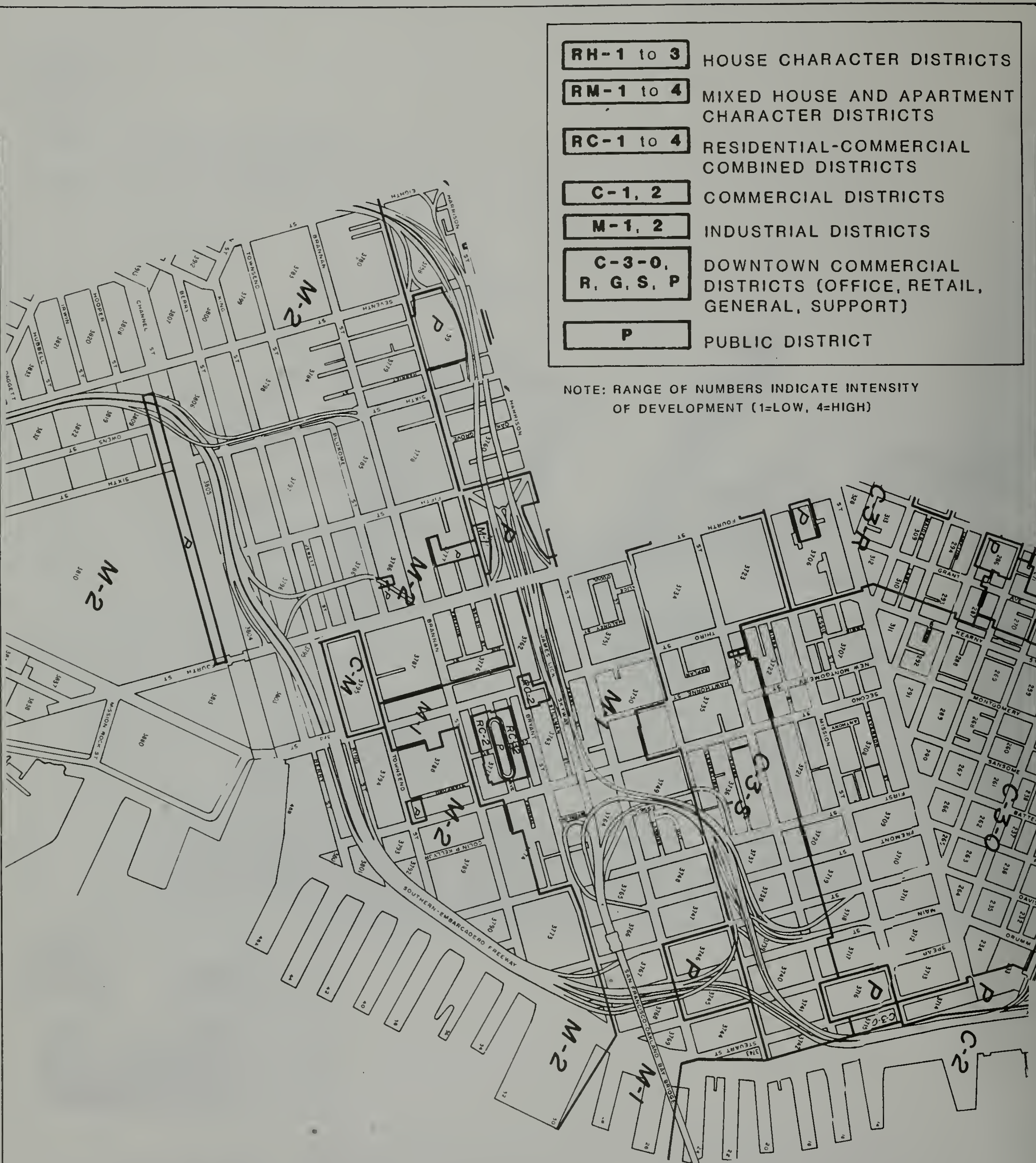
LAND USE MAP C

SOURCE: SAN FRANCISCO DEPARTMENT OF CITY PLANNING SURVEYS, 1981-1982, EIP FIELD CHECKS, SEPTEMBER, 1983



IV-3

LAND USE MAP C



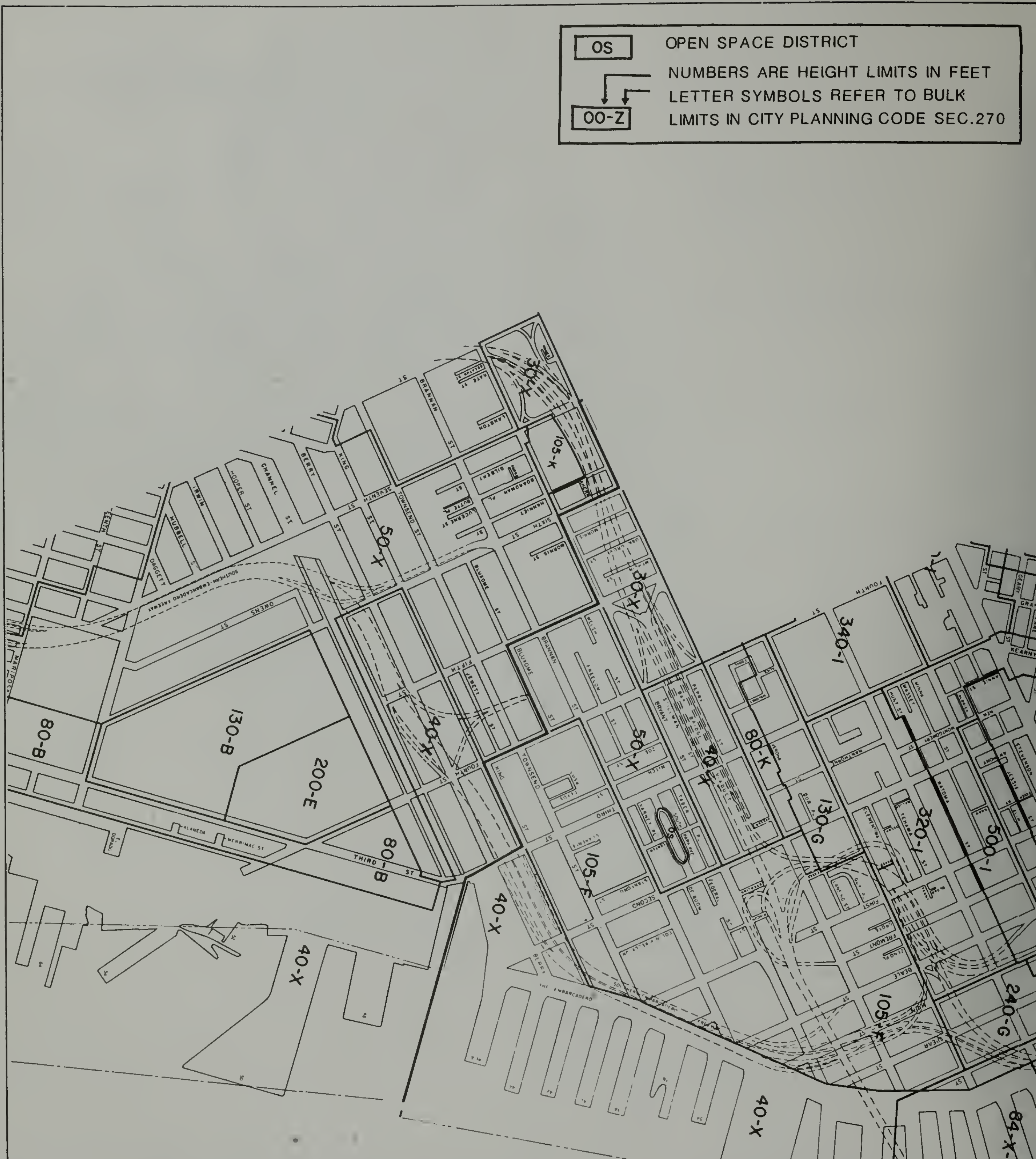
SAN FRANCISCO ZONING MAP

NOTE: DESIGNATED ZONING WITHIN THE RINCON POINT-SOUTH BEACH AREA IS SUPERCEDED BY THE RINCON POINT-SOUTH BEACH REDEVELOPMENT PLAN (SEE FIGURE IV-7).

SOURCE: CITY & COUNTY OF SAN FRANCISCO

FORT MASON
AQUATIC PARK
THE EMBARCADERO
M-1
SCALE FEET
0 400 800 1600

IV-4



SAN FRANCISCO HEIGHT AND BULK MAP

NOTE: DESIGNATED HEIGHT AND BULK WITHIN THE RINCON POINT-SOUTH BEACH REDEVELOPMENT AREA IS SUPERCEDED BY THE RINCON POINT-SOUTH BEACH REDEVELOPMENT PLAN (SEE FIGURE IV-77).

SOURCE: CITY & COUNTY OF SAN FRANCISCO

IV-5

SAN FRANCISCO HEIGHT AND BULK MAP

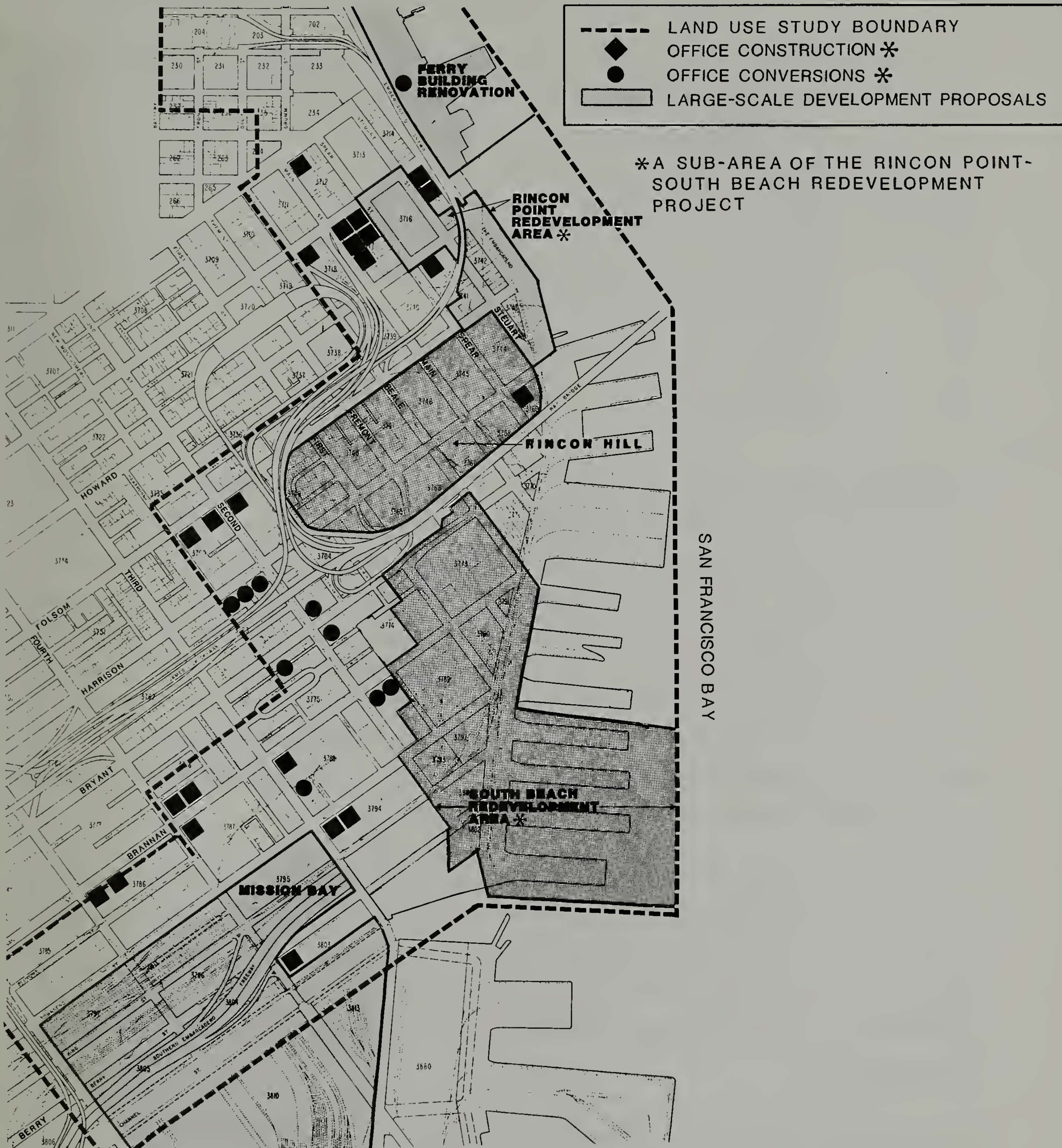
project while Piers 34 and 36 are in marginal non-maritime uses. Only Piers 26, 28, 30 and 32 are in active maritime uses at present.

Rincon Hill serves as the western anchorage of the Bay Bridge. The hill is the edge of the southern extension of a strong trend toward replacing office support services and industries with secondary office space uses. The area is an almost lot-by-lot mix of office support and office uses.

The Rincon Point Redevelopment Area includes a four-block area along the Embarcadero roadway between the ends of Mission and Harrison Streets. The Rincon Annex Post Office facility and its truck yards are the predominant active uses in the area. Most of the remaining area consists of vacant lots, parking lots and condemned structures.

Other portions of the area south of Market Street within the land use impact study area is experiencing pressure for more intensive (e.g., office) land uses. West of Steuart Street, the blocks bounded by Mission and Market streets are undergoing rapid conversion to high-intensity office uses. However, along much of the Embarcadero roadway, the 40-foot and 84-foot height limits (see Figure IV-5) have preserved a transition zone between the office towers and the waterfront.

Trends and Planned Land Uses. The area south of Market Street has been the most dynamically changing area in San Francisco over the past decade, and proposed project and special area plans point to an even more dramatic transition for the area in the 1980s. During the 1970s 9.2 million square feet of new office space was built South of Market, or about 60% of all new major office space built in downtown San Francisco over that period.[1] There are 22 projects proposed or approved for new office construction within the South of Market portion of the project's land use study area (Figure IV-6). Conversions of industrial or warehouse space account for an additional 18 proposed or approved projects. In addition, there are currently three major projects either under consideration or under way which involve major new uses with area-wide significance: the Mission Bay proposal, the Rincon Point/South Beach Redevelopment Area project, and the Rincon Hill Plan (see Figure IV-6). Together these projects constitute planning for a major shift of the South of Market corridor between lower Market Street and China Basin from industrial, warehouse, marine and secondary office support uses to more intensive office uses, and high-intensity housing and commercial uses.



CUMULATIVE DEVELOPMENT SOUTH OF MARKET

SCALE 0 400 800 1200 FEET

* Additional information on these projects is on file with the Office of Environmental Review, 450 McAllister St., 5th Floor, and is available for public review.

MARCH, 1984

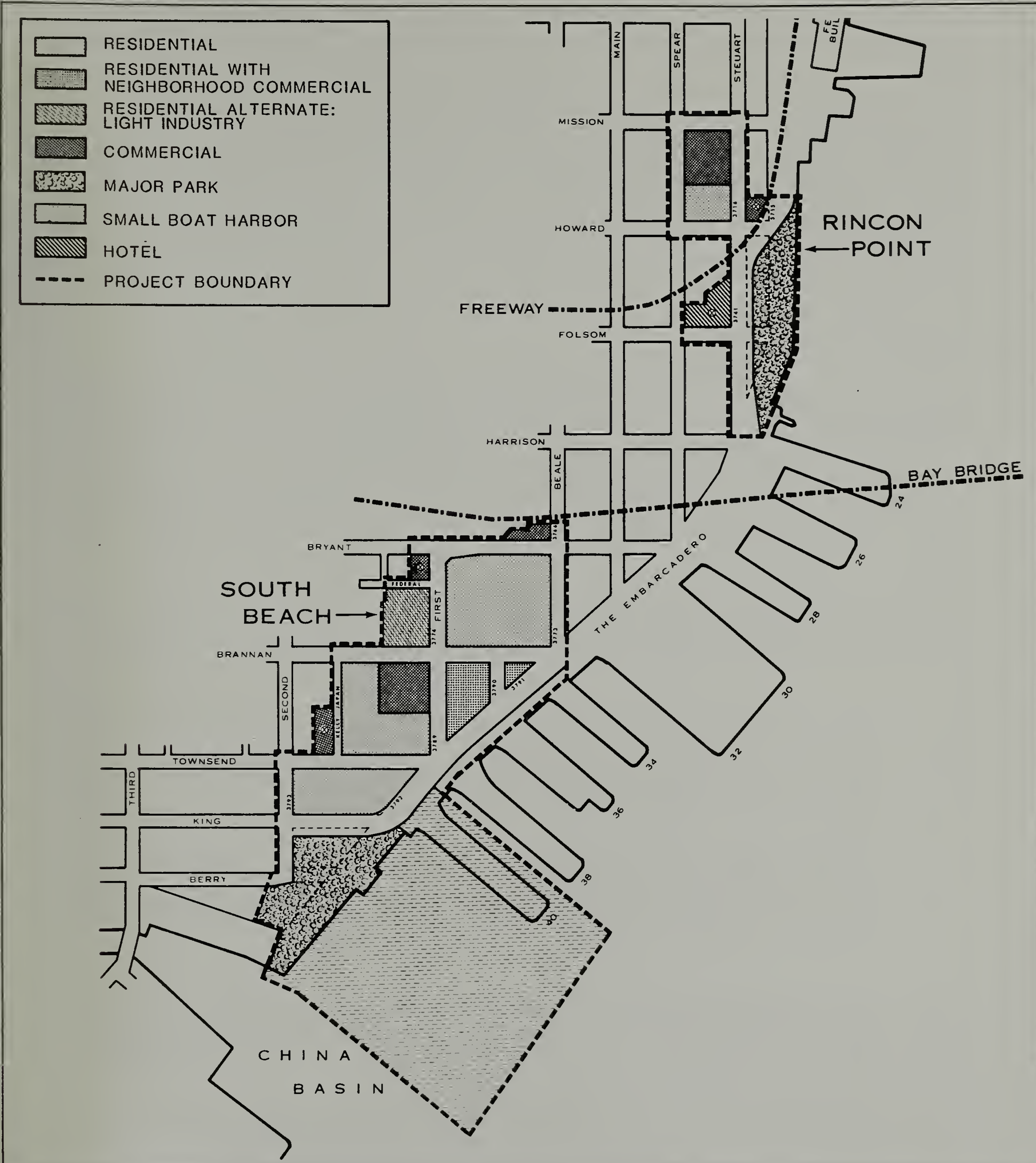
IV-6

The City has prepared a Downtown Plan for inclusion into the San Francisco Comprehensive Plan. The Downtown Plan was published for citizen and environmental review in August 1983, with expected adoption of a final plan in 1984. The Downtown Plan's focus is to manage growth in the downtown C-3 district (see Figure IV-4). The key issue of the Downtown Plan is the downzoning of a small area. Downzoning of San Francisco's C-3 District is presented as a means of allowing growth without disruption; redirecting growth away from the sensitive residential areas north of Market Street (especially North Beach and Chinatown); decreasing the overall allowable size, height and bulk of buildings; and increasing the amount of open space/solar access downtown. The rezoning and development of the Rincon Hill area to primarily residential use is an example of downzoning of office uses.

A detailed environmental analysis of the Downtown Plan has been prepared. Preliminary analysis indicates that although the Downtown Plan would reduce the maximum potential for growth in the downtown C-3 district, the Plan projects that as many as 91,260 new jobs could be added to the downtown between the years 1984-2000, an amount about equal to ABAG's projected City-wide employment increase. The net effect of the Plan is the redirection of the location of office and commercial growth in San Francisco, not the limiting of overall growth in the City. One impact of the Downtown Plan could be to encourage growth in areas which are suitable as future transit markets, such as the area south of Market Street. The Plan focuses on creating growth in areas where the high density of jobs would promote a heavy reliance on public transit.

The Santa Fe/Southern Pacific Development Company has proposed a 208-acre mixed use development in the China Basin area. As proposed by the sponsor, the project could generate up to 16,000 new residents and 22,000 employees in the China Basin area. No proposal has been formally submitted for City approval. Extensive revisions to the City's Comprehensive Plan and Zoning Ordinance would be required prior to any City action on the proposal.

The South Beach subarea of the Redevelopment Project (see Figure IV-7) will develop as a neighborhood, with residential, neighborhood commercial, park and recreational uses. The nineteenth-century Oriental, Cape Horn and Japan Street warehouses will be retained and adapted for re-use. Most of the project area will be devoted to high-intensity residential uses. The southern corner of the project area will be devoted to a major new public park and a small boat harbor along the park's water frontage from Piers 40 to 46A.



RINCON POINT-SOUTH BEACH REDEVELOPMENT PROJECT LAND USE PLAN

SCALE 0 400 800 1600 FEET

SOURCE: SAN FRANCISCO REDEVELOPMENT AGENCY

IV-7

The Rincon Point subarea of the Redevelopment Project (see Figure IV-7) will include commercial, hotel, housing and park uses. The Postal Service has relocated most of its mail processing functions from the Rincon Annex building to a new facility in the India Basin Industrial Park; the building will be historically restored and much of the space made available for adaptive commercial re-use with a new residential structure in place of the sheds and lot behind. The hotel may include 400 to 800 units at a site along the Embarcadero roadway; this site might alternatively be developed with housing at a density of 150-300 units per acre.

The proposed Rincon Hill Plan covers an area of approximately 55 acres encircled by the Bay Bridge and the Embarcadero Freeway. The area would consist of a combination of residential, commercial, industrial, and open space uses. Up to 7,500 residential units and 932,000 square feet of commercial space could be added to the Rincon Hill area under this plan.

Relationship of Land Use Trends to Transportation Projects. Considered together, these projects are strong indicators of several major trends relevant to transportation projects:

- Land values are increasing rapidly (see Section IV.B for more detail). Rising prices are overshadowing existing structural values and causing intense pressure to build new structures, especially in the C-3-S zone where many three- and four-story older buildings exist at a fraction of the allowable intensity and height in an area easily accessible to the Market Street corridor.

- Industrial uses are being forced out of the Howard to Townsend Street corridor by rent pressure, and many are moving to new industrial spaces south of China Basin, in the India Basin and Hunter's Point areas. The City's "South of Market Interim Controls Memorandum" (1/26/82) states that 37 industrial firms relocated from the South of Market area between 1975 and 1980.

- The new uses being introduced to the area are more population-intensive than the declining industrial uses. Office and commercial uses have much higher daytime worker and customer populations than industrial uses, and the proposed high-intensity residential and hotel uses will introduce a 24-hour population in an area that has been largely abandoned after nightfall.

- These economic and social changes will decrease use of large transport vehicles to move goods and materials along east-west corridors and increase individual trips in private automobiles and by transit, along predominantly north-south routes.

c. The Ferry Building and Areas North of Market Street

<u>Existing Land Uses.</u> The various subareas north of Market Street function more as autonomous units, compared to the highly integrated land market and functional districts of the South of Market portion of the study corridor. For this reason the various subareas are discussed separately below. Existing land uses in this area are shown in Figures IV-2 and IV-3.

The Ferry Building area is a key transitional area between waterfront, office and industrial land uses in San Francisco. The Ferry Building segment incorporates four zones marking the transition from water to highrises. At the water's edge there are four major structures: the Agriculture Building, the Ferry Building, the BART platform and Pier 1. The Agriculture Building and the Ferry Building are presently in office, restaurant and retail uses. Much of the BART platform area has been leased by the Port to a new restaurant and to the Golden Gate Ferry Terminal. Pier 1 contains about 400 parking spaces and its northside slips are used by Golden Gate Transit ferries when not in service. A proposed project would renovate most of the Ferry Building, Pier 1 and portions of the Agriculture Building with office, restaurant, retail and public uses.

The second zone inland is comprised of the Embarcadero Freeway overhead and the Embarcadero roadway at grade level. The Roadway zone includes the Belt Line Railway and three lanes of surface parking, which are bordered on either side by two to three lanes of roadway. The third zone is comprised of a 100-foot band of low-rise and open space uses separating the roadway from the high-rise district. These uses include the East Street Row, the Muni bus turnaround area and Justin Herman Plaza. The highrise district begins immediately beyond this zone.

The Golden Gateway Redevelopment District encompasses approximately ten blocks bounded by Broadway, Front Street, Jackson Street and the Embarcadero roadway. With the completion of Golden Gateway Commons III in 1983, the project includes four mid-rise (22- to 25-story) apartment buildings, three blocks of low-rise townhouses and office structures, a 2.5-acre park, 240,000 square feet of office and retail space and 930 parking spaces.[2] This project and other proposed new development are shown in Figure IV-8. Sydney Walton Park, the central space of the project area, is one of only a few significant public green space accessible to downtown workers. The Golden Gateway area

CUMULATIVE DEVELOPMENT NORTH OF MARKET

SCALE 0 400 800 1600 FEET

* Additional information on these projects is on file with the Office of Environmental Review, 450 McAllister St., 5th Floor, and is available for public review.

March, 1984

IV-8

is oriented to office spaces bordering on the west and south; it is cut off from the waterfront and the area north of Broadway by the curve of the Embarcadero Freeway and its ramps in this area.

Pier 3 is used for open storage and office space. The Klamath and Santa Rosa historic ships are moored at the pier and used as office space. Pier 5 is abandoned and the Port Commission plans to remove it and possibly use the space as a commercial recreation area. Pier 7 is in poor condition and is used as surface parking. The Port plans to remove it to create open water space or possibly rebuild it for usable open space.[3]

Piers 9 through 35 are among the most actively used piers in the project area. In 1981-1982, 48,000 passengers passed through Pier 35, embarking or disembarking on 72 cruise ships that called on San Francisco. Piers 9-33 are involved in industrial cargo, break-bulk and assembly, and maritime support activities, while Pier 9 is the headquarters for a tugboat fleet. Much of the street frontage on the inland side of the Embarcadero roadway and limited spaces along these piers is devoted to non-maritime uses, including restaurants and commercial space.[4] Most of the fractional blocks bordering the Embarcadero roadway are owned by the Port. North of Pier 19 these lots are being built up or converted to low-rise office uses, the most significant contribution to this trend being the seven-block Levi's Plaza project with four acres of landscaped open space. West of the Port-owned blocks many brick warehouses have been renovated as prestigious office spaces. Together with Levi's Plaza and several large, new condominium projects, these restored warehouses comprise a high-intensity, high-priced mixed-use district which has retained some of the character of the buildings of the former maritime district. The Special Area Plan No. 1: San Francisco Waterfront recommends that Piers 9 through 35 be retained in maritime use as long as economically feasible, and that Pier 35 be renovated as a modern passenger terminal.[5] Further, it is a policy of this plan that when and if maritime use of any pier in the area of 9-35 is phased out, no new development should occur until a Total Design Plan for the entire area is adopted by BCDC. The Port of San Francisco is now in the design phase for the Pier 7 Public Acess program and has also begun work on the Pier 9-35 Concept Plan program.

The Fisherman's Wharf area is a major tourist attraction, the home of San Francisco's commercial fishing fleet, and a major retailing area. To its south and east is a residential district. These uses occur generally in bands, with commercial fishing concentrated on

the water side of Jefferson Street between Pier 45 and the Hyde Street Pier ("Fish Alley"), tourist attractions between Jefferson and North Point and at Pier 39; general retail along North Point; and high-density residential south of North Point Street.

The first industries to locate at Fisherman's Wharf were labor and water-intensive uses. Beginning in the 1850s, a smelter, a woolen mill, the Ghirardelli Chocolate Factory and the California Fruit Company cannery opened in the area.[6] Commercial fishing appeared near the turn of the century and began to attract restaurants to the edge of Fish Alley in the 1930s. An increasing concentration of restaurants, amusement centers, and specialty retailers soon began to create the tourist attraction of the Wharf, recently extended by the Pier 39 and Anchorage centers. The historic renovation and adaptive reuse of Ghirardelli Square and the Cannery in the 1960s created a new type of retail/restaurant center, while large specialty retailers such as Cost Plus Imports and Tower Records filled another niche in the retail spectrum. In recent years, at the base of Telegraph Hill, high-density residential developments have begun to take over abandoned warehouse sites along North Point and Bay Streets, and now almost ring the foot of Telegraph Hill.

Aquatic Park and Fort Mason are operated as public open space and recreational and community activity facilities under the auspices of the Golden Gate National Recreation Area (GGNRA). The Maritime Museum, the grandstands, and the breakwater forming the lagoon date from the 1930s.

Fort Mason was founded as a U.S. Army Reservation in the 1850s. It was used as an embarcation point for overseas forces from 1912 through the Korean War, and was turned over to the GGNRA in the 1970s as an urban arts, cultural and recreational facility. Today, three of the old army structures are used by community groups and another structure is used for a youth hostel.

Trend and Plannned Land Uses. There is no dominant pattern in land use trends that is common to all the areas north of Market Street within the project corridor. Unlike the South of Market area, which is generally organized in a series of bands of declining intensity parallel to Market Street, the northern areas are relatively autonomous, and do not interact as land markets or as functional components. The characteristic shared by the various areas discussed below is their continuing and increasing intensity and high land values.

The office development of the 1970s and projects currently underway are revitalizing the foot of Market Street, introducing tens of thousands of employees to this area and offering them many amenities such as Justin Herman Plaza and the Promenade south of the Agriculture Building, the Hyatt Atrium and the Embarcadero Center. The proposed Ferry Building complex would add significantly to public spaces in the area and link such uses with the Bayside waterfront.

The completion of the Golden Gateway project and the succession of new residential projects at the foot of Telegraph Hill are together bringing many new residents to newer, high-density, high-priced residential neighborhoods in the northeastern waterfront. When considered in combination with warehouse to office conversions and new office developments such as Levi's Plaza, these projects are converting the areas between the Ferry Building and Pier 39 from maritime-related warehousing to new office and residential neighborhoods.

The Fisherman's Wharf Action Plan proposes to preserve the local fishing industry, improve transportation, parking and pedestrian circulation facilities, upgrade Jefferson Street as the major corridor of the area, and introduce a mixed-use residential complex to the Pier 45 site. The net effect of these actions should be to support the existing commercial activities rather than produce any significant changes in the character of the Wharf.

The Golden Gate National Recreation Area General Management Plan calls for increasing the maritime history activities at Aquatic Park and complementing the community activity spaces at Fort Mason with development of park landscaping and visitor accommodations. At Aquatic Park the old Haslett Warehouse will be adapted to provide additional maritime museum space, and the current complement of 5 historic ships will be increased to up to 12 ships as funds permit, to be moored in the lagoon. The Hyde Street Pier might be demolished and replaced by a new pier, and a common entry plaza would be developed at the intersection of Hyde and Jefferson Streets.

At Fort Mason many of the old building foundations and unnecessary roadways are being removed to allow the development of a large landscaped park with provisions for both active and passive recreational activities in the "upper fort" area. Clearance for park development will be balanced with preservation of historically valuable structures.

Pedestrian access will be improved in the Cultural Center area at the northwest corner of the site.

Relationship of Land Use Trends to Transportation Projects. In general, high-intensity commercial and residential activities are replacing low-intensity industrial and warehousing activities from the Ferry Building to Pier 39. This transition is increasing both the residential and daytime population of the area thereby creating new demands for improved transportation access. In the past this area was weakly served by public transit and provided a surplus parking supply relative to demand in the area. Transportation projects for the area will need to support the transition in land use by addressing the demands for access and the balance between parking and transit access.

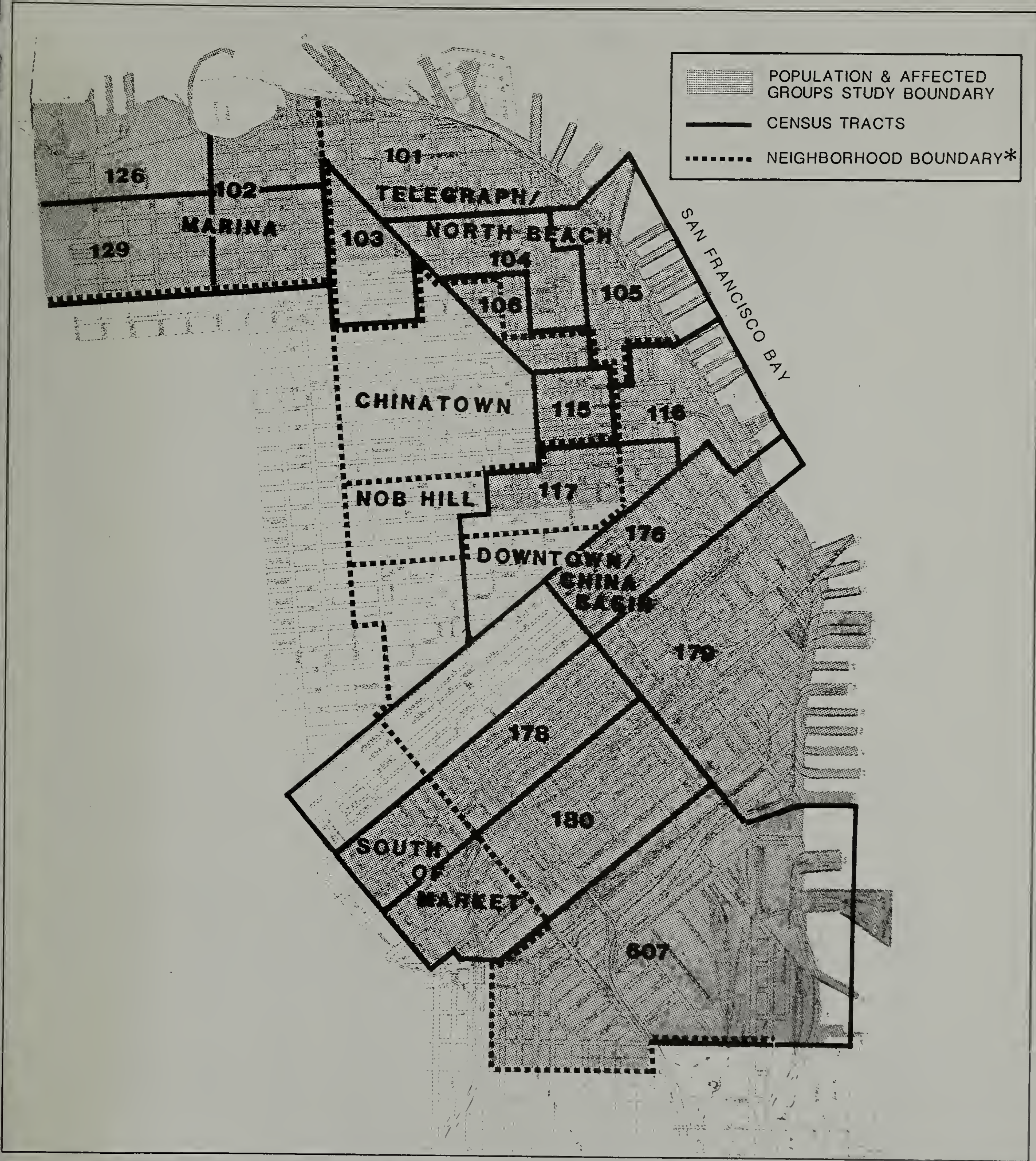
In the Fisherman's Wharf and Pier 39 areas retail commercial activities require continued and improved access from downtown hotels and to the region as a whole. The ongoing and planned transportation improvement projects must consider the need of merchants in the area for convenient car and transit access and sufficient parking.

Improvements to Fort Mason and Aquatic Park represent both intensification of the existing recreational uses, and improvements of the outdoor recreational spaces. While Fort Mason plans to provide parking for its visitors, it also recognizes that improved transit access is needed to support both local and tourist access to the area. Parking, roadway and transit projects must also take into account the need to protect the tranquil pedestrian and recreational spaces planned for Fort Mason and Aquatic Park.

2. Population and Affected Social Groups

a. Population and Demography

The City's total residential population was reported by the 1980 census to be 678,974 persons, of which approximately 37,500 (5.5%) live within the project study area. Figure IV-9 shows the project study area for purposes of Section IV.A.2., Population and Affected Social Groups. This study area is somewhat larger than the land use study area because population impacts are more indirect in nature and thus affect a larger area. From 1960 to 1970 the City's population decreased by 24,000 people (3.3%), and from 1970 to 1980 the City's population declined an additional 5.1% (36,700 persons). (See Table IV-1). This trend is expected to reverse in the future and by the year 2000 it is projected that the population of the City will increase by 2.1% to a total 693,000 persons.[7]



CENSUS TRACTS AND NEIGHBORHOOD BOUNDARIES

SCALE 0 1600 2400 4800 FEET

* SOURCE: 1977 EDITION OF THE DISTRICT HANDBOOK, SAN FRANCISCO GUIDE TO SUPERVISORAL DISTRICTS

IV-9

Table IV-1
POPULATION CHANGE IN SAN FRANCISCO AND PROJECT STUDY AREA
(1960-2000)

	POPULATION				RATE OF CHANGE (%)		
	1960[1]	1970[1]	1980[1]	2000	1960-70	1970-80	1980-2000
San Francisco	740,316	715,674	678,974	693,000[2]	-3.3	-5.1	+2.1
Project Study Area	41,793	38,734	37,500	53,800[3] 80,500[4]	-7.3	-3.2	+26.2 +68.2

Data From:

[1] U.S. Census Bureau 1960-1980 Source:
- California Labor and Statistics Library
- Association of Bay Area Governments

[2] Source: ABAG, Projections '83, June 1983, page 102.

[3] Based on a low net increase of projected housing units (see Table IV-6). Assumes average household size for new units in the study area will equal year 2000 citywide average household size. Citywide average household size equals 2.034 (Source: ABAG, Projections '83, June 1983, page 102).

[4] Based on a high net increase of projected housing units (see Table IV-6).

Consistent with the citywide trend, population in the I-280 project study area has declined steadily since 1960. The extent of the decline was 7.3% (3,059 persons) between 1960 and 1970 and 3.2% (1,234 persons) between 1970 and 1980. However, the development transition underway in the South of Market area could increase population in the project study area by the year 2000. The extent of this increase is undetermined because it is recognized that there are many uncertainties associated with the implementation of the various projects proposed in the South of Market area. Uncertainties include market conditions, funding availability, land acquisition and possible changes in city policy.

Assuming various levels of implementation of proposed projects, population in the study area could be expected to experience a net increase of between 16,300 and 43,000 persons in the next 20 years (Table IV-1 and IV-2). This projection assumes average household size in the project area would equal city-wide average household sizes. Most of the increase is expected to occur south of Market Street.

The population of the City is following a national trend of smaller family size, increased longevity and a gradual aging of the population base. In 1980 persons aged 60 and over comprised 20% of the City's population (Table IV-3). The study area, with 9,294 (25%) of its residents being over 65, has a high proportion of elderly residents.

Within the study area, the Telegraph Hill/North Beach area (Census Tracts 101, 104, 105 and 106)[8] has the highest proportion of young people (Table IV-4). Figure IV-9 shows Census Tract boundaries in the study area.

San Francisco has a high percentage of Asians and Pacific Islanders, Hispanics and Blacks. The City's minority population in 1980 totaled 311,872 or 46% of the City's total population. This compares to a nine-county regional figure of approximately 25%. The study area has a minority population of 13,433 persons or 36% (Table IV-3).

Citywide the median family income was $20,911 in 1980, compared to $18,957 for families in the study area. Median family income varied significantly between a high of $48,605 and a low of $9,710 for different census tracts within the study area. As defined by the U.S. Census Bureau, 22,808 (16%) families in San Francisco, and 624 (9%) families in the study area had incomes below the poverty level.

Table IV-2

POPULATION CHANGE IN PROJECT STUDY AREA BY CENSUS TRACT
(1960-1980)

	POPULATION			RATE OF CHANGE(%)	
CENSUS TRACT	1960[1]	1970[2]	1980[2]	1960-1970	1970-1980
101	2043	2796	2548	36.8	-8.9
102	4218	4363	4102	3.4	-6.0
103[3]	1705	1779	1690	4.3	-5.0
104	5368	5547	4791	3.3	-13.6
105	103	38	339	-63.1	792.0
106	4528	4411	4440	-2.6	0.6
115	1061	1011	842	-4.7	-16.7
116	934	1938	1620	107.0	-16.4
117[3]	842	719	601	-14.6	-16.4
126	5632	3819	5002	-32.2	30.9
129	6571	6136	5731	-6.4	-6.6
176[3]	941	315	354	-66.5	12.4
178	4979	3590	3656	-27.8	1.8
179.01[3]	1458	554	374	-62.0	-32.4
180	1402	1706	1365	21.6	-19.9
607	8	12	44	50.0	266
TOTAL	41,793	38,734	37,500	-7.3	-3.1

Data From:

[1] U.S. Census Bureau, Source: Calif. Labor and Statistics Library

[2] U.S. Census Bureau, Source: Association of Bay Area Governments

[3] Data is for portion of tract illustrated by Figure IV-8.

Note: 1960 Block data was aggregated when necessary to compensate for difference between 1960 and 1970/80 census tract boundaries.

Table IV-3

SUMMARY OF DEMOGRAPHIC CHARACTERISTICS IN STUDY AREA AND SAN FRANCISCO

	STUDY AREA	CITY
POPULATION	37,500	678,974
• Race		
% White	67	53
% Black	4	12
% Asian Pacific Ilnd.	25	21
% Hispanic	5	12
% Other Minority	0.3	0.5
% Total Minority	36	46
• Age		
% 18 and under	10	17
% 19 - 59 yrs.	65	62
% Elderly (60+)	25	20
• Sex		
% Male	51	49
% Female	50	50
• Marital Status		
% Single	39	34
% Married	31	34
% Other	28	19
• Education		
% High School grad.	19	22
% College 1 - 3 yrs.	19	19
% College 4+ yrs.	30	22
• **Disabled Persons (%)**	8.5	6

	STUDY AREA	CITY
INCOME		
• **Median Family**	$18,957	$20,911
• **Below Poverty Level**		
% Total Population	13	13
% Minority	19	20
% Families	9	16
% Persons under 60	13	14
% Elderly (60+)	21	10
HOUSING		
• **Total Units**	22,099	316,608
% Single Family	9	35
% Multi Family	91	65
% Owner Occupied	13	32
% Renter Occupied	78	63
% Occupied	93	94
% Vacant	7	5
o **Average Household Size**	2.4	2.1
EMPLOYMENT		
• **Number of Workers**	21,117	364,689
% Unemployed	6	6
% Minority Unemployed	2	7
% White Collar	58	63
% Blue Collar	33	31

	STUDY AREA	CITY
TRANSPORTATION		
• **Means of Getting to Work** (% of Workers)		
Public Transportation	37	35
Automobiles	31	43
Walk	23	10
Motorcycles, Bikes, etc.	2	2
• **Number of Automobiles** (% of Housing Units)		
None	42	35
1	46	42
2	10	17
3 or more	2	6
• **Persons with Public Transportation Disability** (% of Workers)		
'6 and over	4	5

TABLE IV-4
DEMOGRAPHIC CHARACTERISTICS OF STUDY AREA
(by Census Tracts)

AREA	CHINA BASIN			SOUTH BEACH/ RINCON HILL		DOWNTOWN: NORTH OF MARKET			NORTH BEACH					MARINA			
CHARACTERISTICS	178	180	607 (1)	176 (2)	179 (2)	115	116	117 (2)	101	103 (2)	104	105	106	102	126	129	STUDY AREA TOTAL
POPULATION	3656	1365	45	354	374	842	1620	601	2548	1690	4791	339	4440	4102	5002	5731	37,500
RACE (3)																	
% White	30	35	100	56	39	16	84	58	56	63	63	81	30	91	91	85	67
% Black	11	36	0	41	33	1	2	6	11	0	0	0	1	0	0	0	4
% Asian Pacific Ilnd	40	6	0	6	24	75	8	32	27	34	34	10	65	5	5	8	25
% Hispanic	11	19	0	7	0	4	1	19	4	2	3	6	2	4	3	6	5
% Other Minority (4)	1	2	0	0	57	0	0	1	0	1	0	0	0	0	0	0	0.3
% Total Minority	61	62	0	64	0	81	11	59	42	36	37	12	68	10	8	14	36
AGE																	
% 18 and under	11	9	0	13	3	0	2	1	18	12	13	11	20	4	10	6	10
% 19 - 59 yrs.	49	84	100	70	68	53	57	88	62	68	70	66	64	68	61	70	65
% Elderly (60+)	40	4	0	16	24	43	38	29	19	20	18	14	17	29	31	23	25
SEX																	
% Male	58	78	80	71	72	73	52	55	54	58	51	75	55	42	39	41	51
% Female	42	22	20	19	28	27	48	45	46	52	49	25	44	58	61	59	50
MARITAL STATUS																	
% Single	36	43	42	80	14	49	30	68	29	43	37	37	33	37	38	45	39
% Married	25	18	0	9	20	27	32	22	30	33	33	33	40	32	33	28	31
% Other (5)	31	30	58	10	32	24	33	27	24	16	19	18	15	28	25	23	28
EDUCATION (6)																	
% High School grad.	32	22	20	53	47	26	27	37	14	30	27	5	20	10	35	32	19
% College 1-3 yrs.	29	19	20	18	24	21	34	21	16	19	22	23	23	29	23	29	19
% College 4+ yrs.	23	9	42	12	6	17	60	37	28	45	50	77	22	69	52	45	30
DISABLED PERSONS (%)	16	10	38	0	13	4	3	13	6	4	2	0	6	7	2	4	8.5

Data from 1980 U.S. Census, ABAG, CAL Dept. of Finance, CAL Labor and Statistics Library

(1) This Census Tract could include some people staying at the recreation vehicle park on King Street

(2) For a portion of the Census Tract (see Figure IV-8).

(3) Persons of Spanish origin within each ethnic group are included under Hispanic. Races other than those listed made up approximately 0.5% of the study area population and approximately 0.4% of the ity's ılati

(4) Includes American Indians, Eskimos, Aleut.

(5) Divorced, widowed, separated.

(6) For those 18 and older.

TABLE IV-4 (continued)

AREA	CHINA BASIN			SOUTH BEACH/ RINCON HILL		DOWNTOWN: NORTH OF MARKET			NORTH BEACH					MARINA			STUDY AREA TOTAL
CHARACTERISTICS	178	180	607	176	179	115	116	117	101	103	104	105	106	102	126	129	
INCOME																	
° MEDIAN FAMILY	9,719	11,442	0	0	16,850	14,792	33,107	13,750	$14,306	20,021	21,170	48,605	15,819	32,915	28,399	22,425	18,957
° BELOW POVERTY LEVEL																	
% Total Population	24	16	0	21	47	21	4	31	18	13	15	4	19	6	5	8	13
% Minority	7	15	0	11	29	22	0	21	34	21	24	0	19	5	4	5	19
% Families	7	33	0	0	0	7	1	0	21	9	15	0	12	4	4	4	9
% Persons under 60	24	15	0	23	34	22	6	30	20	16	15	5	19	6	4	7	13
% Elderly (60+)	5	30	0	9	4	20	3	15	14	3	14	0	78	5	98	8	21
HOUSING																	
° TOTAL UNITS	2138	'290	17	332	217	98	1255	420	1505	927	2622	232	1982	2950	3413	3691	22,099
% Single Family	3	10	100*	0	7	0	4	5	6	6	9	7	4	10	18	11	9
% Multi Family	97	92	0	98	83	92	97	93	94	87	91	98	96	91	82	89	91
% Owner Occupied	1	7	59	0	0	5	1	0	7	12	18	66	9	22	19	12	13
% Renter Occupied	88	87	41	45	71	98	91.	93	88	76	64	21	83	71	77	84	78
% Occupied	90	92	100	47	78	94	90	94	90	88	93	84	93	93	97	96	93
% Vacant	10	8	0	53	22	6	11	6	10	6	7	16	7	8	3	4	7
° Average Household Size	1.90	5.66	1.8	2.28	2.13	7.86	1.43	1.33	1.80	1.98	1.97	1.86	2.4	1.50	1.54	1.63	2.4
EMPLOYMENT																	
° NUMBER OF WORKERS	1355	306	37	153	210	366	1039	465	1365	1150	3026	211	2474	2714	3110	3009	22,117
% Unemployed	14	8	0	32	24	11	3	13	3	4	2	6	6	4	3	4	6
% Minority Unemployed	9	3	0	27	9	11	7	8	2	1	1	0	2	0	1	1	2
% White Collar	43	36	73	12	26	28	87	48	70	67	72	86	48	86	81	53	58
% Blue Collar	43	57	27	56	51	61	10	38	26	29	26	6	46	14	15	20	33
TRANSPORATION																	
° TO WORK (% of Workers)																	
Public Transportation	32	30	0	23	32	41	12	23	41	38	28	20	25	35	43	50	37
Automobiles	24	25	49	26	5	11	12	12	27	29	29	42	18	43	42	34	31
Walk	20	14	0	36	29	37	66	68	25	15	32	22	44	12	5	8	23
Motor Cycles, Bikes, etc.	2	7	51	0	0	0	1	0	1	3	1	0	1	2	3	2	2
° NO. OF CARS (% of Hshlds)																	
None	68	43	18	90	61	76	51	75	41	37	34	8	55	26	27	36	42
1	28	35	18	6	23	24	48	10	48	40	49	76	34	59	59	50	46
2	3	10	41	0	0	0	2	3	6	14	14	12	7	14	13	11	10
3 or more	0	0	23	0	4	0	0	0	2	0	4	0	0	2	2	2	2
° PERSONS 16 & OVER WITH PUB. TRANSPORTATION DISABILITY (%)	12	2	0	0	10	8	5	7	6	2	2	0	2	4	3	3	4

* Mobile Homes & Trailers

b. Housing

Housing in the City is generally characterized by the predominance of multi-family units. During the past 10 years the majority of all residential building permits issued have been for units in multi-family structures. In 1980, 71% of all housing units completed in the City were multi-family units. With the exception of the South Bayshore area all other planning districts in the City had a net increase in housing units from 1968-1979. Citywide, the greatest net additions occurred in the Richmond and Central districts. In the study area the most dramatic increase in the number of total units between 1968 and 1979 occurred in census tracts 101, 106, and 129, all located north of the downtown area. Within the study area, net increase of housing units are expected to continue at rates similar to, or possibly greater than those of the past decade. However, the location of new residential development is expected to occur primarily in the South of Market area. According to unofficial projections by the City Planning Department, between 1981 and 2001 the total net increase in the number of new housing units in the City is forecast to be between 15,000 and 33,000 dwelling units, of which between 8,000 and 21,150 are expected to be built in the corridor area (see Table IV-5).

c. Neighborhoods

The project area includes portions of eight neighborhoods - China Basin, South of Market, Downtown, Chinatown, Telegraph Hill, North Beach, and the Marina. These neighborhoods are a part of three planning and political districts recognized by the City. Figure IV-9 shows the relationship of the project study area to the general neighborhood boundaries, the City's planning districts, and Census Bureau tracts. The reference to the neighborhood boundaries is made primarily to give a general indication as to where neighborhood areas are located. It should be emphasized that these boundaries are approximated as there is typically considerable overlap between the bounds of neighborhoods as perceived by residents throughout the city.

Neighborhood conditions and community cohesion vary throughout the study corridor. The cohesion of a community is affected by a number of factors, including the degree of homogeneity of a community; the frequency of daily social interactions, use of common facilities, or interaction at local social, religious or political institutions; and the residents' cultural, political and social perceptions.

Table IV-5
NEW HOUSING UNITS

A. PROJECTED NEW DWELLING UNITS IN SAN FRANCISCO, 1981-2001[1]

	Net Increase Potential[2]			Gross Increase Potential[3]	
	Low	Baseline	High	Low	High
Total	15,000	20,000	33,000	32,840	47,310

B. PROJECTED NEW HOUSING UNITS - DOWNTOWN 1981-2001[1,4]

	Net Increase Potential[2]			Gross Increase Potential[3]	
	Low	Baseline	High	Low	High
Total	7,600	10,100	16,700	16,620	22,110

C. PROJECTED NEW HOUSING UNITS IN STUDY AREA, 1981-2001[1,5]

Location		Gross Increase Potential	
		Low	High
Rincon Hill		1,700	3,400
Rincon Point		200	800
South Beach		1,700	2,200
Yerba Buena Center			2,700
Office Required Housing[6]	6,524	8,702	
Proposed Developments			154
Mission Bay		7,500	12,500
TOTAL STUDY AREA		17,624	30,456

D. COMPARISON OF PROJECTED NEW HOUSING UNITS, SAN FRANCISCO AND[4] STUDY AREA, 1981-2001

	Net Increase			Gross Increase	
	Low	Baseline	High	Low	High
City Total	15,000	20,000	33,000	32,840	47,310
Study Area Total	8,000	10,650	21,150	17,824	30,660

[1] I-280 Transfer Concept Program, Technical Working Paper 1.5.6. Travel Demand Forecast, July 8, 1983, Table II-6, page II-1b.

[2] Memorandum by Christine Haw, Housing Section, San Francisco City Planning Department, December 8, 1981. Projection were developed for "worst case" analysis of Muni vehicle needs and may be high. They do not represent official city policy of the Department of City Planning.

[3] Inter-Agency Staff Meeting (MTC, ABAG, DCP, Muni), December 2, 1982

[4] Net increase for downtown and the study area is based on same percentage reduction between net and gross increase for city total.

[5] I-280 Transfer Concept Program, Technical Working Paper 2.2.4 Social, April 13, 1983, Table 5, page 20. Also includes some projected new units within two blocks of study area boundary.

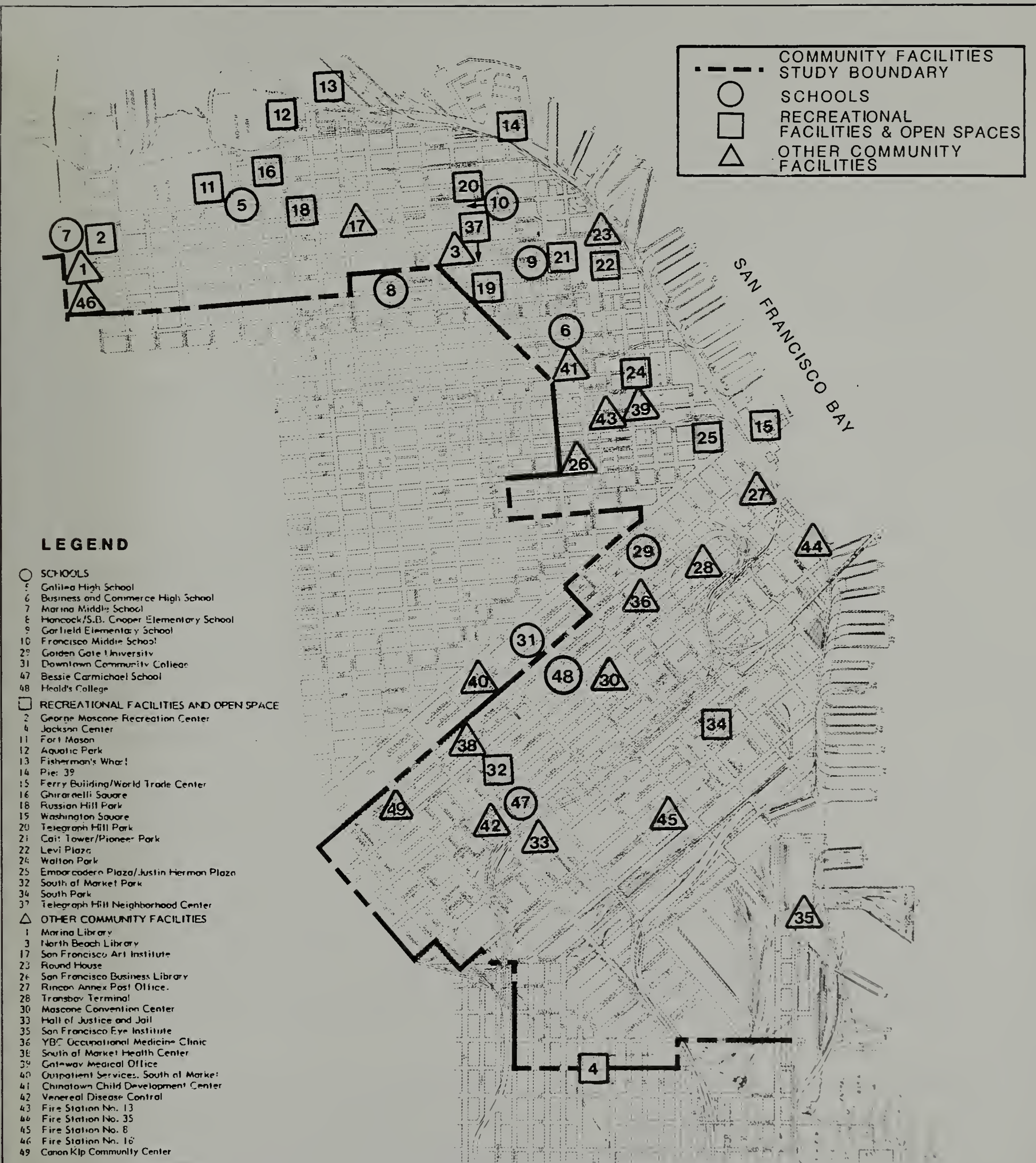
[6] Housing required for major office developments may not necessarily be located in the study area.

There is a considerable variation in the condition of neighborhoods within the study area. The South of Market/China Basin area, for discussion purposes, is referred to as all of the general area south of Market Street. This area has a high proportion of low income and elderly residents. Historically it has been a holding area for new San Francisco immigrants. The area currently consists of several sub-communities with different life styles and cultural backgrounds. In recent years portions of this area have experienced a large influx of Vietnamese and Filipino residents. Much of the housing is in various stages of disrepair. There are several missions in the area which provide shelter, food and social services for the needy. In the Yerba Buena Center redevelopment area several housing projects for the elderly have been built in the past decade. Major civic and public facilities in the South of Market area include the Moscone Convention Center, the Hall of Justice, and the Rincon Annex Post Office (see Figure IV-10).

The portion of the downtown area included in the Embarcadero Corridor takes in the core of the City's Financial District and the Embarcadero Center area. This is a predominantly white collar employment area dominated by office space and a variety of associated shops and restaurants. Most housing in the area consists of middle to upper income condominiums located in the Golden Gateway project area adjacent to the Embarcadero Center. The last phase of condominiums in the Golden Gateway project area is currently under construction.

Pedestrian activity is heavy in the Ferry Building segment. There is a strong pedestrian link between the Embarcadero Center and the Ferry Building. The Justin Herman Plaza is frequently the site of various outdoor cultural and civic activities. This area tends to be the hub of pedestrian and recreational activity along this portion of the waterfront.

The Telegraph Hill/North Beach area is primarily middle income with a large Italian population in North Beach. In recent years the Chinese population has been growing in North Beach due largely to North Beach's proximity to Chinatown. Housing densities average from two to nine units per structure. There is both strong pressure in this area for more intense housing development and conversion of housing to other uses. Conversions can displace transient renters and elderly people who cannot afford to purchase housing. Luxury condominiums have recently been completed near Levi's Plaza.



COMMUNITY FACILITIES WITHIN THE I-280 POPULATION AND AFFECTED GROUPS STUDY BOUNDARY

SCALE 0 1600 2400 4800 FEET

NOTE: BUILDOUT OF CUMULATIVE DEVELOPMENT PROPOSALS (E.G. MISSION BAY, RINCON HILL, RINCON POINT-SOUTH BEACH) WILL RESULT IN THE NEED FOR ADDITIONAL COMMUNITY FACILITIES WHICH ARE YET TO BE DETERMINED.

IV-10

The remaining portion of the north end of the Embarcadero Corridor includes the Fisherman's Wharf/Pier 39 area and the Marina neighborhood. The Fisherman's Wharf/ Pier 39 area is the center of social, tourist and recreational activities along the waterfront, and local development is tourist oriented. The Marina is primarily a white upper middle class neighborhood with a large single population. Housing is generally well maintained and there are excellent views of the Marina and Bay. The Marina Green area is a popular site for jogging, kite flying and volleyball.

The project study area has a system of public, quasi-public and private facilities and services which support community interaction (Figure IV-10).

d. The Transportation Disadvantaged[9]

The elderly, the young, the poor and the disabled do not share the same level of mobility enjoyed by most of the population. These groups, for physical, economic or legal reasons are typically in a situation where they are unable to drive or do not own an automobile. As a result people within these groups, referred to as transportation disadvantaged, are dependent on public transportation, walking, or bicycling as their primary means of transportation. Statistics indicate that there is a high percentage of transportation-disadvantaged households within the study corridor. The percentage of households without automobiles is higher in the study area (42%) than citywide (35%). In census tract 176 (the area immediately south of Market Street), an area with a high proportion of low-income and minority residents, 90% of households have no automobile. Sixty percent of trips to work for residents of the study area are by either public transportation or foot. This compares to a citywide percentage of 45%. Some of this difference could be attributable to choice and the proximity of the project area to the City's major employment center. However, demographic data supports the notion that a relatively high percentage of transportation disadvantaged persons reside in the project area.

Elderly residents comprise 25% of the study area's population, of which 21% have incomes below the poverty level. Both these percentages are higher than citywide totals which are 20% and 10% respectively. Areas within the project area with relatively high percentages of elderly residents include the Marina (CT 102); South of Market near the Moscone Center (CT 178); and downtown north of Market Street (CT 115-117).

Thirteen percent of the total residents in the project area have incomes below the poverty level, which is equal to the citywide percentage. Concentrations of individuals with low incomes within the study area occur in the eastern portion of Chinatown (CT 106, 115) and in the area south of Market Street (CT 176, 178, 179, 180). These areas also have the largest concentrations of minority households within the study area.

A total of 8.5% of study area residents are disabled in some manner. The South of Market area (CT 178-180) has the largest percentage of disabled residents.

To summarize, several portions of the study area appear to have large concentrations of transportation disadvantaged. The largest concentration appears to be in the area south of Market Street with other concentrations occurring in the eastern portion of Chinatown (CT 106, 115, 117) and the Marina (CT 102).

3. Urban Design

San Francisco has a unique city image in that it is defined by water on three sides and can be viewed almost entirely from nearby land masses and bridges. The degree to which the water's edge is recognized and enhanced is an important urban design consideration of waterfront development.

San Francisco's waterfront has changed dramatically since its origin as the village of Yerba Buena. The irregular shoreline followed the bases of what are today Telegraph, Rincon and Potrero Hills. Through the gradual filling of natural low water areas, the shoreline was extended and made more regular. The seawall, which was built between 1878 and 1889, transformed the waterfront into a uniform edge and represented a changing attitude toward waterfront development. Extending from Pier 47 in the north to Pier 46 in the south, it established new commercial and recreational opportunities for using the Bay, on a completely new scale. After the seawall was established, finger piers were built over a period of time to increase the efficiency and volume of maritime uses. Bulkheads were added later to screen what was considered to be the unsightliness of pier facilities. Other important design elements along the waterfront include the Bay Bridge, the Embarcadero Freeway, the historic ships, the Ferry Building, the piers and Aquatic Park. The photographs in Figures IV-11 through IV-16 show selected views of existing conditions along the waterfront corridor from China Basin to Aquatic Park.

**EXISTING CONDITIONS:
THE I-280 FREEWAY STRUCTURE IN CHINA BASIN**

IV-11

**EXISTING CONDITIONS:
SOUTH BEACH AREA**

IV-12

EXISTING CONDITIONS:
THE EMBARCADERO AT THE FERRY BUILDING

IV-13

EXISTING CONDITIONS:
PIERS 9–35

IV–14

EXISTING CONDITIONS: FISHERMAN'S WHARF

IV-15

EXISTING CONDITIONS:
AQUATIC PARK

IV-16

a. Views

The clarity of connections between land and water contributes to the perception that the waterfront is readily available as a relief or counterpoint to the density of San Francisco's urban development. The opportunity to view water contributes to the perceived accessibility of the water's edge. Visual cues of water and water-related activity may be as important as actual views of the water. Consequently, views of shipmasts, bridges, piers and bulkheads, and related sounds, such as ship and fog horns, help maintain and enhance a sense of the waterfront. Many north-south streets offer open views to the Bay. The elevated Embarcadero Freeway affords travelers views of the City to the west and views of the waterfront and Ferry Building to the east. However, from many parts of the City's Financial District, densely grouped high-rise buildings block pedestrian-level views to the waterfront area. Also, waterfront views are observed from points inland of the Embarcadero Freeway. Between Market Street and the Bay Bridge, views are directly across the Embarcadero roadway. In many cases, however, the scenic waterfront views are obscured by bulkheads and other structures, especially between Piers 9 and 35.

Portions of Highways 480, 80 and 101 in the waterfront area are currently identified by the California Scenic Highway Program Master Plan as being eligible for scenic designation. The City has identified a portion of the surface street system through Fisherman's Wharf and around Fort Mason as a part of the 49-Mile Drive. The latter is not an official scenic roadway designation, but is indicative of the potential which the entire waterfront area holds as a tourist and recreational attraction.

The concept of scenic routes typically includes the ability to stop and observe, or to travel at a speed and in a state of mind that allows one to adequately comprehend and enjoy the surrounding landscape. The Embarcadero Freeway in particular, and, to a lesser degree, the Embarcadero surface roadway, are not truly scenic drives at present because they offer little or no opportunities to stop and enjoy particular views at leisure.

b. Access To and Along the Waterfront

Given the significance that the waterfront edge has for a city, any roadway along that edge assumes a special character and the quality of movement along the roadway is important to the perceptions people have of the city. At present, the Embarcadero surface roadway does not have a consistent character throughout its length. It changes from a broad expanse of asphalt interrupted by railroad tracks in China Basin, to defined

lanes which weave between the piers of the elevated freeway structure, to a broad roadway along the Bulkheads, and then to a set of narrowed streets ending in the congestion of commercial activity at Fisherman's Wharf. The roadway is confusing at crucial points between the North and South Beach areas, making it difficult to know exactly where the Embarcadero roadway begins and ends. The elevated Embarcadero Freeway creates additional ambiguity by introducing a non-stop roadway above a portion of the Embarcadero surface roadway.

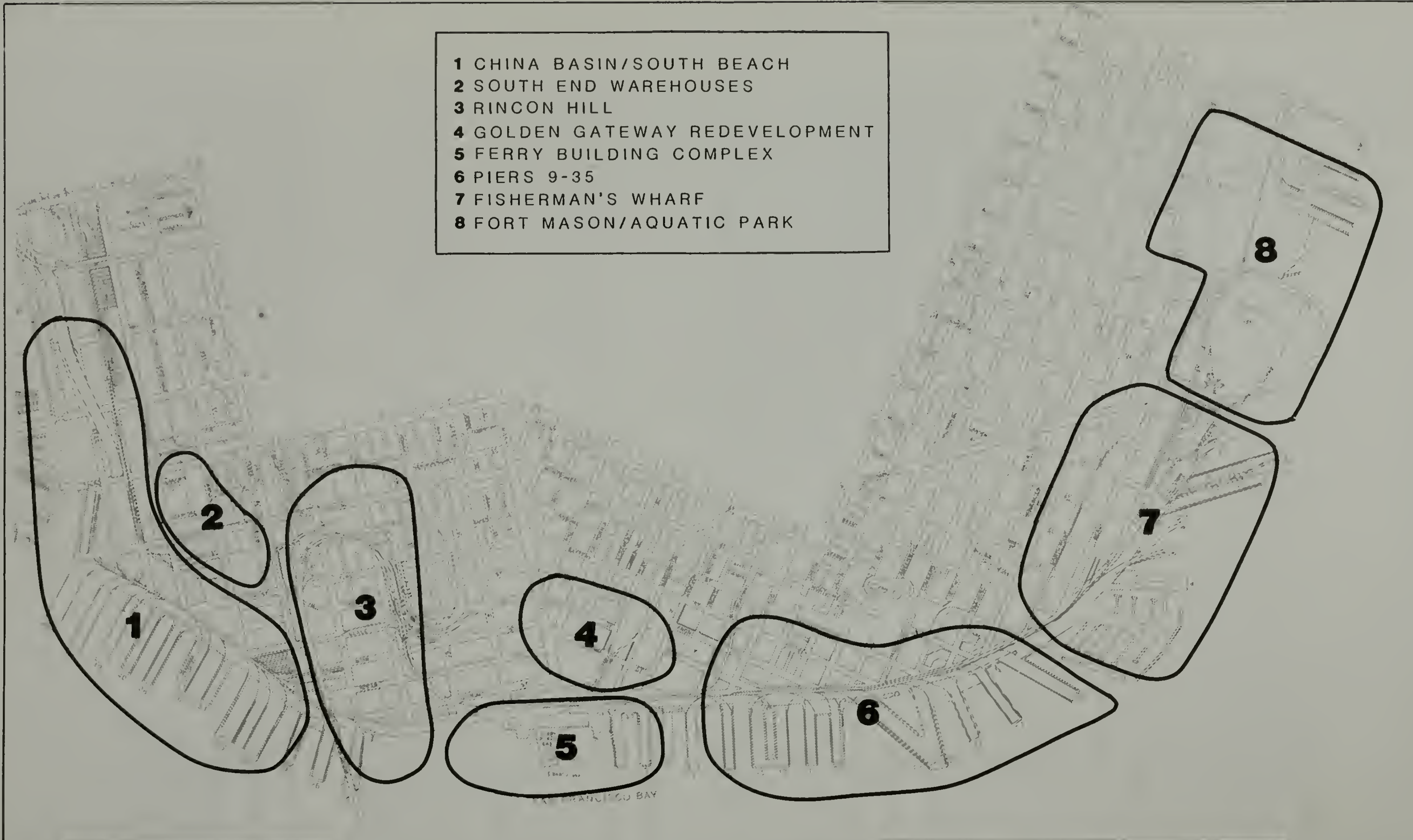
The City street grid intersects with the curve of the Embarcadero roadway at various angles, often creating small triangular sites. Presently, many of the intersection configurations create difficult merging patterns and pedestrian crossings are particularly awkward. The difficulties are compounded by the numerous rails which fill the roadway. The waterfront contains numerous large surface parking lots, especially in China Basin, South Beach, under freeways and on some piers. The Embarcadero roadway median near the Ferry Building is used for parking, making pedestrian access to the waterfront confusing. At the base of Telegraph Hill some parking is being replaced by office space. The Pier 39 garage does not make a positive urban design contribution to the area due to the pedestrian bridge over the roadway, its large size and the congestion it causes.

c. Buildings and Districts

The Embarcadero roadway passes through several waterfront districts containing some of the oldest development in the City (see Figure IV-17). The specific buildings and groups of buildings which identify these districts contribute to the diverse character of the San Francisco waterfront.

Most development in the China Basin/South Beach District occurred between World Wars I and II. SP railyards and the I-280 structure dominate the landscape in which few distinctive buildings remain.

The South End Warehouse District is a loosely defined group of buildings characteristic of late nineteenth-century maritime activity in San Francisco. Warehouses were often developed at the bases of piers which were extensions of streets. Warehouses also reflect the kind of trade which predominated at a particular time. The Basalt block paving which was once found throughout the waterfront is still common in some of the alleyways of this area.



URBAN DESIGN DISTRICTS IN I-280 CORRIDOR

IV-17

The Rincon Hill District was one of the first fashionable residential areas in San Francisco until the Second Street cut was made in the 1880's. Today, very little remains to indicate its former character, and the Bay Bridge obscures even its topography. Rincon Hill contains warehouses and a few scattered Victorian vintage houses.

The Ferry Building District includes the East Row, piers, bulkheads and buildings north to Pier $1\frac{1}{2}$. Structures in the East block are the last survivors of boarding houses and saloons which once lined the waterfront. The Ferry Building dates back to 1890. From the Bay, its lighted sign and clock tower create a memorable symbol of the City. The clock tower can also be viewed from the Embarcadero Freeway and Market Street. From many inland points, however, views of the Ferry Building are blocked by high-rise buildings in the Financial District and by the Embarcadero Freeway. The Ferry Building area is scheduled for rehabilitation which would restore the main structure and integrate it with the adjacent Agriculture Building and Pier $1\frac{1}{2}$ buildings. This project includes promenades, glass arcades, shops and offices.

The existing Golden Gateway Redevelopment Area dates from the 1950's (see Section IV.A.1, Land Use), but the site itself was once the location of the San Francisco produce market. A consistent paving pattern, pedestrian bridges over streets within the development, and common building materials give the area a strong visual coherence.

In the Pier 9-35 district, the finger piers were built following construction of the seawall, completed in 1889. At that time the area was still open to the water. The bulkheads, which give this area its present visual character, were designed and constructed during the period 1917-1930. Most of the piers were rebuilt in the 1930s and are still sound. Bulkheads block most views to the water, but the pier frontage and enduring maritime use create a cohesive appearance. Located at the base of Telegraph Hill, the area also has strong topographic boundaries.

The Fisherman's Wharf District was first developed with water intensive industries in the mid-1800's with commercial fishing appearing near the turn of the century. This district typically contains one- and two-story buildings with numerous oversized signs that add to the area's intensely commercial atmosphere. While the architectural character of individual buildings is not distinguished, the combined effect creates a valuable physical resource.

The Fort Mason/Aquatic Park District has a distinct open space character and contains a remnant of natural Bay shoreline. Fort Mason was founded as a U.S. Army Reservation in the 1850's and was used as an embarcation point from 1912 through the Korean War. Aquatic Park has been a popular waterfront recreation area since the 1870's.

d. **Parks, Promenades and Open Spaces**

The existing waterfront open spaces and recreational areas include Fort Mason, Aquatic Park, Justin Herman Plaza, and the Embarcadero open water and promenade. (See Chapter VI, Historical and Archaeological Resources and Parkland, for a detailed discussion of parklands.) Some open spaces on private developments also contribute to the available open space.

Fort Mason contains a number of historically significant buildings (see Chapter VI). The lower pier area accommodates public activities such as theatre, radio, sculpture, painting and dance.

Aquatic Park has a long history as a public recreation area. The present public improvements on the Park were the result of Works Projects Administration projects. Its facilities include a museum, a mooring for historic ships, a protected harbor for sail boats, an open green area, and a beach. The curved pier there offers a unique vantage point for viewing the entire North Beach area. Fort Mason and Aquatic Park are both units of the Golden Gate National Recreation Area of the National Park Service.

Justin Herman Plaza, in the Golden Gateway area, was designed as a buffer against the Embarcadero Freeway. Consequently, its green spaces and bermed plantings obscure views to the water.

The Embarcadero roadway open water and promenade area represents a new approach to waterfront recreation design by making the water's edge visible and accessible. A planted area inland of the promenade is planned for the future.

Proposed open space areas include Pier 7, the South Beach Park and the park on the waterfront in the Rincon Point Redevelopment Project subarea. The South Beach Park would feature a grassy park and a 700-slip marina within the South Beach Redevelopment Project subarea. The two projects suggest future recreational uses which may come to

characterize the San Francisco waterfront. Several large private developments, such as Levi's Plaza and Pier 39, provide open space which is part of the waterfront recreational network.

B. ECONOMIC AND FINANCIAL SETTING

1. Urban Economy

San Francisco is the major office center in the Bay Area with approximately 61 million square feet of office space. Between 1965 and 1980 approximately 1.7 million square feet per year of downtown office space were added for a cumulative total of 29.5 million square feet.[10]

The study area for the I-280 study's economic analysis covers a large portion of northeastern San Francisco (see Figure IV-18). It includes all of the downtown area, the Fisherman's Wharf/Marina districts, and the area south of Market Street east of U.S. 101 and north of Army Street (Islais Creek Channel). Such a large economic study area was chosen because of the potential for widespread economic impacts resulting from implementation of various I-280 TCP elements. In the areas adjacent to the Embarcadero Corridor, a full range of economic uses are covered. The Fisherman's Wharf area is one of the best-known tourist sites in San Francisco. Piers 9-35 are under review to determine if their traditional maritime uses can coexist with the new commercial and residential developments in the area (i.e., Levi's Plaza and 100 Lombard).

In the vicinity of the Ferry Building, the intensive high-rise office activities of the downtown interface with open space and low intensity retail and office uses along the waterfront. The high rises extend several blocks south of Market and are beginning to displace the medium intensity office support economic activities (i.e., printing, photographic, office furniture and supplies) that once shared Rincon Hill with warehouses and truck yards. The San Francisco Department of City Planning has recently prepared a plan for the downtown (C-3 district) based upon an exhaustive study of alternative growth scenarios, which could have a major impact on the rate of office development in the downtown. The plan addresses the distribution of development in the area south of Market Street, an area designated for increased growth in the near future. Although some of the warehouses and light industrial uses on Rincon Hill and in South Beach are still active, there is a strong trend to convert these structures to office or showroom businesses. In the China Basin area, the dominant uses have historically been heavy industrial and rail-related warehousing. These uses have been declining in recent years.

ECONOMIC STUDY AREA

SCALE 0 1000 2000 4000 FEET

STUDY AREA BOUNDARY
MISSION BAY BOUNDARY
AREA OF EXISTING & POTENTIAL OFFICE - COMMERCIAL - RESIDENTIAL DEVELOPMENT SOUTH OF MARKET ST.

IV-18

a. General Development Trends

Within the I-280 Transfer Concept Program economic study area approximately 19,934,570 square feet of net new office and retail construction and conversion development has been approved, is under construction, or is under formal review by the Department of City Planning (see Figure IV-18).[11] The approximate 19,934,570 square feet does not include the proposed $2 billion Mission Bay project.

Due to the continuing strong demand for primary office space in the downtown area and the diminishing supply of developable sites north of Market Street, office developers have been turning to the area south of Market Street. Figure IV-6 illustrates the general area south of Market referred to in this section. A portion of the C-3 District as described in the Downtown Plan EIR lies within this area. This area, considered less than a decade ago to be undesirable for office, commercial, and residential development, is presently considered one of the most fertile areas for San Francisco's future growth. About 29%, or 5,543,850 square feet, of the proposed office development and 34%, or 308,500 square feet, of retail development under consideration or approved by the Department of City Planning are located in the south of Market Street area. Approximately 53%, or 650,400 square feet, of proposed conversions, primarily from warehouse or manufacturing space to be used for office space, is located in the area south of Market Street. The majority of the proposed development is to be developed by private developers (national and international).

Office growth in the area south of Market Street is creating speculation in land values. In 1979 land sales in the area averaged $37 per square foot. Due to the growing demand for office space in the area the land value in 1981 increased to an average of $50-60 per square foot.[11] Office space lease cost in the area south of Market Street averaged $12-15 per square foot annually in 1981, which is considerably lower than downtown office space lease cost (which averaged $30 per square foot). Despite the cost differences in office space the lease cost of $12-$15 is considered more than double the maximum industrial users can afford to pay.[11]

Existing industrial users who do not own their facilities are faced with limited options as their leases expire: renewing their leases, buying their land and building(s), or moving to another location. Between 1975 and 1980, San Francisco experienced a net decrease of 90 industrial firms, and the area south of Market Street shown in Figure IV-18 experienced a

net decrease of 37 industrial firms.[12] Despite this decline, industrial use has increased by 300,000 square feet in the area south of Market in the last five years (not including recent shipping industry increases), indicating that industrial use is still viable in the area. Examples of industries that prefer the south of Market area include printing, office maintenance, and clothing manufacturing and construction, which require access to local clients and the downtown labor pool.

Of the development proposed to occur in the study area, several major proposals stand out. The proposed $2 billion 208 acre Mission Bay project would include residential, commercial, and light industrial uses, adding as much as 7 million square feet of office space. The Rincon Point/South Beach Redevelopment Area is proposed to add residential, office, commercial, warehouse and open space uses. The Rincon Hill Plan would allow up to 7,500 residential units and 932,000 square feet of commercial space in the twelve blocks bounded by Bryant, Folsom, Stewart, and Essex Streets. Other major developments in the study area include the luxury condominiums at Telegraph Landing, conversion of the Belt Line Roundhouse near Pier 27 into an office, restaurant and museum complex, the Ferry Building rehabilitation, the Embarcadero Terraces office proposal, and Muni yard redevelopment.

b. Employment Trends

In 1981 approximately 280,900 people were employed and approximately 15,270 companies were located in the study area (see Table IV-6). Fifty-seven percent of study area businesses employed 1 to 5 employees, followed by 19% with 6 to 10 employees, 13% in companies with 11 to 25 employees and 11% with more than 25 employees. Sales volume in the study area was approximately $84.5 million, with most businesses (54%) having sales volumes of less than $250,000 (see Table IV-7).

The City's Downtown Plan EIR projects that employment in the City's C-3 district could increase by 91,260 between 1984 and 2000. ABAG projects that city wide employment will increase by 104,000 jobs between 1980 and 2000.[13]

Proposed cumulative development in the area south of Market Street (as shown in Figure IV-6) would increase employment primarily in office/administrative activities. The proposed 5,543,850 square feet of net new office space in this area could generate 22,175 office-related jobs. The proposed 308,500 square feet of retail space could generate 881

Table IV-6

EMPLOYEES AND BUSINESSES LOCATED IN THE STUDY AREA[1] (1981)

Number of Employees and Businesses by SIC[2]

SIC	Number of Employees	Percent	Number of Businesses	Percent
Agriculture	430	0.5%	65	0.5
Mining	5,980	2.0	45	0.5
Construction	6,390	2.5	400	3.0
Manufacturing	34,330	12.0	1,320	9.0
Transportation	30,780	11.0	795	5.0
Wholesale	26,770	10.0	2,190	14.0
Retail	37,880	13.0	3,700	24.0
FIRE[3]	49,150	17.0	1,855	12.0
Service	89,190	32.0	4,900	32.0
Total	280,900	100%	15,270	100%

Total Number of Businesses by Range of Employment

1 - 5	6 - 10	11 - 25	26 - 100	101 - 499	500+	TOTAL
8,755	2,892	2,060	1,200	307	56	15,270

[1]For the Economic section, the study area covers a large portion of northeast San Francisco, more specifically zip code areas 94102, 94103, 94104, 94105, 95107, 94108, 94109, 94111, 94123 and 94133.

[2]SIC: Standard Industrial Code.

[3]FIRE: Finance, Insurance and Real Estate

Source: Market Profile Analysis, Donnelley Marketing, Inc., 1981 (based on 1980 Census). Donnelley Market Identifiers (DMI) File, The U.S. Department of Commerce -Bureau of Census, the Federal Home Loan Bank Board (FHLBB) Office Deposit Report, National Credit Union Administration (NCUA) Financial and Statistical Report.

Table IV-7

1981 SALES VOLUME RANGE FOR COMPANIES LOCATED IN THE STUDY AREA[1]

SIC[2]	Number of Businesses	Sales Volume/ $000's
Agriculture	65	$ 100
Mining	45	33,200
Construction	400	700
Manufacturing	1,320	5,900
Transportation	795	15,000
Wholesale	2,190	9,800
Retail	3,700	1,800
FIRE[3]	1,855	14,100
Service	4,900	3,900
Total	15,270	$84,500

Number of Businesses by Sales Volume Range $000's

$250-Less	$250-$500	$500-Million	$1-5 Million	$5-10 Million	$10-50 Million	$50 + Million	Total
8,247	2,750	1,830	1,630	305	305	154	15,270

[1]The study area for this table is the same area described in Table IV-8.

[2]SIC: Standard Industrial Code.

[3]FIRE: Finance, Insurance and Real Estate

Source: Market Profile Analysis, Donnelley Marketing, Inc., 1981 (based on 1980 Census. Donnelley Market Identifiers (DMI) File, The U.S. Department of Commerce - Bureau of Census, the Federal Home Loan Bank Board (FHLBB) Office Deposit Report, National Credit Union Administration (NCUA) Financial and Statistical Report.

jobs. In addition, the Mission Bay project could, at full buildout, generate another 21,000 jobs in the project area. Of the total number of people employed in the economic study area (described in Figure IV-18) in 1981, 56% (158,595) were employed in the south of Market area. Employment south of Market has steadily increased from 1965 to 1981, and is expected to continue to increase as the majority of proposed development and the proposed Mission Bay project are located in this area. Historically the area south of Market Street has generated primarily blue-collar jobs. Though blue-collar jobs still represent a large percentage of jobs, more office-related employment opportunities are being created. These new opportunites are being generated in new high-rise office buildings and converted warehouses located within five to six blocks of Market Street.

2. Fiscal Profiles

The City of San Francisco's financial status is very positive. In 1982, the City experienced a $150 million surplus in revenues as compared to New York City's 1982-83 budget deficit of $1.1 billion.[14] San Francisco's revenue is expected to continue to be positive, and a surplus of just over $30 million exists for the current fiscal year.

The City and County of San Francisco receives revenues from several sources. A major revenue source is the property tax, which is assessed at a rate of $1.17/$100 of assessed value. The City receives approximately 85.3% of all property taxes collected, with 8.6% going to the San Francisco Unified School District and San Francisco College District, 6% going to BART, and 0.1% going to the Bay Area Air Quality Management District. Other major revenue sources include the following: (1) Sales Tax, which is based on a rate of 0.125% of gross retail sales; (2) Utility Users Tax, which correlates directly to the user consumption levels of various utilities and is used to offset the cost of providing electricity, gas, water, sewage and telephone service to customers; (3) Parking Taxes, which are assessed on 15% of gross income of parking garage space not reserved for residential use; (4) Payroll and Gross Receipts Tax, which is paid in two ways: Firms with a tax liability in excess of $500 pay a tax equal to 1.5% of their total payroll while owners of buildings pay a 0.3% gross receipts tax on their retail income; (5) Hotel Tax of 9.75% of gross price per night per room is assessed on hotels; and (6) Transfer Tax of $5/$1,000 of sale price is collected at time of sale of real property. To provide additional assistance for transit services, the City has enacted a Transit Development Impact fee which is levied at the rate of $5 per square foot of new office development downtown.

City and County of San Francisco revenues for fiscal year 1982-1983 are presented in Table IV-8.

The San Francisco Municipal Railway budget for 1984-1985 is $202,173,802. This represents an increase of more than $17 million over the 1983-1984 budget. The sources of revenue are shifting away from state and federal subventions, necessitating greater proportionate funding levels from local sources. In its Short Range Transit Plan, Muni projects that state and federal funding subventions will account for 22% of revenues in FY 1985-1986 (see Table IV-9). Muni projects that these funds will decline to 21% of the budget by 1988-1989. Farebox revenues have comprised roughly 31% of the budget in recent years. If Muni utilizes toll bridge revenues, which can potentially provide substantial funds, then farebox revenues are required to remain at not less than 33% by state law (AB1107). Recently adopted legislation (AB 2337) would allow General Fund monies to be used to attain the 33% level if there is a shortfall. General Fund monies can also be used to increase revenues above the 33% level. Given this distribution of federal, state, and farebox revenues, and a reasonable growth in General Fund revenues, a deficit is projected in 1986-1987 which would have to be made up by General Fund and other, as yet unspecified local sources.[15]

Table IV-8

CITY AND COUNTY OF SAN FRANCISCO GENERAL FUND REVENUES AND EXPENDITURES FISCAL YEAR 1982-1983

Revenues	
Property Tax	$223,457,102
Sales Tax	62,000,000
Utility Users Tax	21,000,000
Parking Tax	8,500,000
Gross Receipts and Payroll Taxes	100,000,000
Hotel Tax	6,730,769
Transfer Tax	11,300,000
Other[1]	378,135,266
Total	$811,123,137
Expenditures	
Administration and Finance	$ 67,685,125
Judicial	53,445,434
Police and Fire Protection	280,690,341
Recreation and Arts	45,389,262
Planning and Public Works	23,020,570
Social Services	161,938,963
Utilities	6,398,034
Health Care	82,023,005
Municipal Railway	77,520,833
Unallocated	13,011,570
Total	$811,123,137

[1]Includes fees for licenses, federal and state subventions and aid, charges for services, revenue transfers and surplus.

Source: City and County of San Francisco. Consolidated Budget and Annual Appropriation Ordinance Fiscal Year Ending June 30, 1984.

Table IV-9

MUNICIPAL RAILWAY BUDGET PROJECTIONS FISCAL YEAR 1985-1986

Revenues	
State & Federal Subventions	$ 47,800,000
Fare and Advertising Revenue	73,807,000
Contribution from General Government	96,808,000
Total	$218,415,000
Expenditures	
Operations	$109,088,000
Equipment Maintenance	59,987,000
Facilities Maintenance	18,997,000
General Management	30,343,000
Total	$218,415,000

Source: City and County of San Francisco. Municipal Railway, Short Range Transit Plan, 1984-1989.

C. TRAFFIC AND TRANSPORTATION ENVIRONMENT

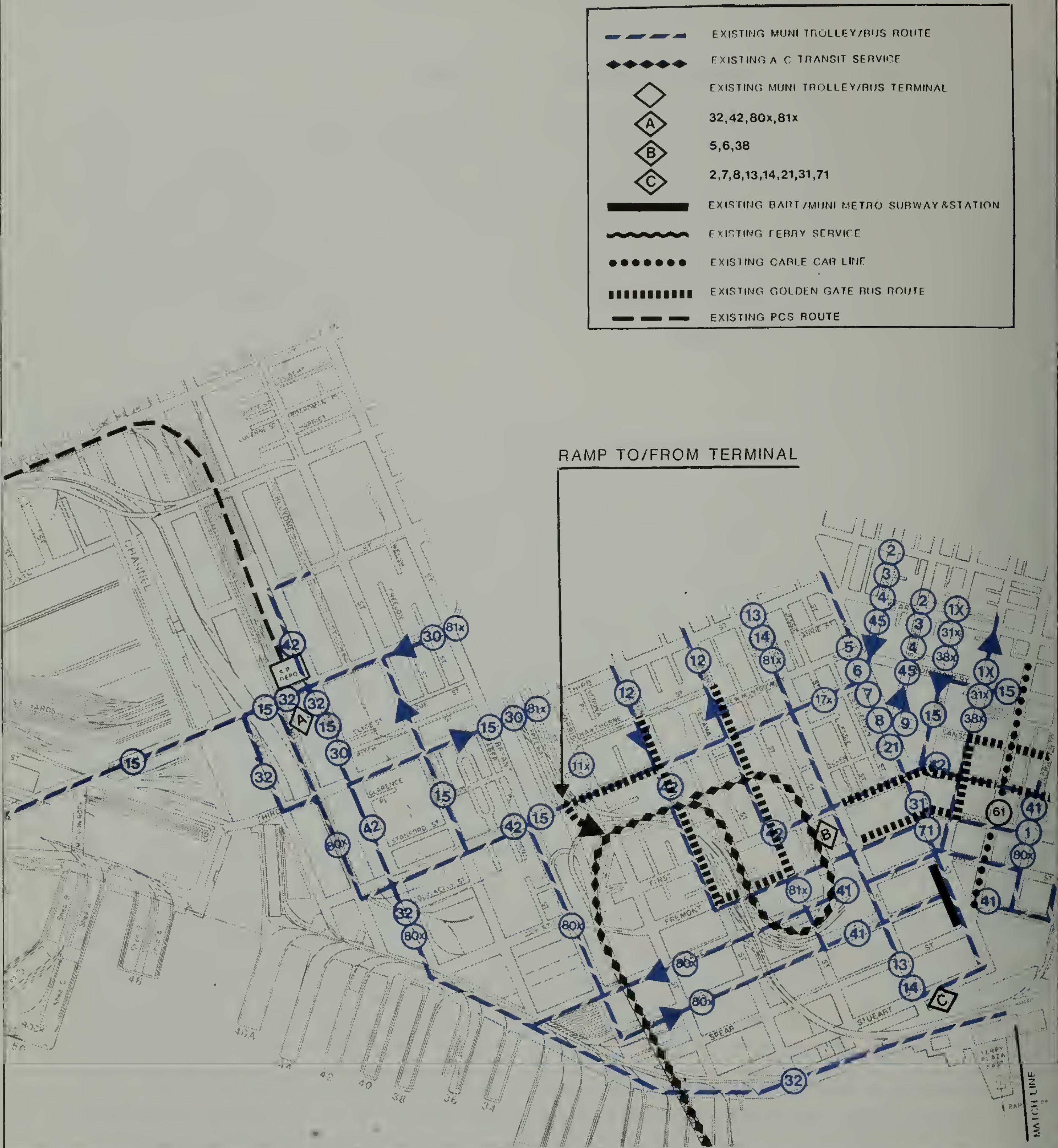
A host of surface, subsurface and water transportation facilities exist in the I-280 Transfer Concept Program project area. Public transit services include both intra- and inter-city bus lines, cable cars, passenger trains, including a rapid transit system, and ferryboats. Local city streets and regional freeways bring private autos and trucks to, from and through the Embarcadero Corridor. In addition, a number of auto parking facilities provide parking for autos with destinations in San Francisco and a rail freight line serves the active shipping piers.

1. Transit Service

a. Existing Service and Ridership Characteristics

San Francisco is served by the following commute transit operators: Muni, BART, AC Transit, Golden Gate Transit buses and ferries, Peninsula Commute Service, and SamTrans (see Figure IV-19). In addition, the privately owned Red and White Fleet ferry provides service to Tiburon and a number of private "club" buses operate commute service for members. All of these operators provide service in or have routes through the Corridor. Many transit services in the Corridor are an integral part of transit services serving the downtown area. Similarly, transit service in the corridor is affected by transit service outside the project area serving the downtown area. Table IV-10 summarizes existing transit corridor travel into the downtown area. The transit data shown in Table IV-10 differ slightly from the corresponding data in the City's Downtown Plan EIR. The differences are due primarily to a larger downtown area used in Table IV-10 than in the Downtown Plan EIR. Also, most of the Table IV-10 data were for the AM two-hour peak period while the Downtown Plan EIR data were for the PM peak period. Except for BART transbay service, all transit operators currently have adequate passenger capacity to meet travel demand during the a.m. two-hour peak period. However, ridership on several systems exceeds the number of seats provided, creating standing conditions throughout the peak period. Also, during the peak one-hour period and on some individual lines crowding is much more severe, with capacities closely approached or exceeded. For example, some individual Muni bus lines have load factors of 1.7 during the entire peak one hour, with even more severe conditions during peak periods within the peak hour.

Existing Muni service along the Embarcadero roadway consists of the 32 Embarcadero bus line from Fisherman's Wharf to the SP Depot. It is estimated that the 32 Line presently



EXISTING TRANSIT ROUTES IN PROJECT CORRIDOR

IV-19

EXISTING TRANSIT ROUTES

Table IV-10

EXISTING TRANSIT TRAVEL TO DOWNTOWN SAN FRANCISCO

Two-Hour AM Peak Period/Peak Direction (Unless Otherwise Noted)

	Volume (Passengers)	Seats Provided	Capacity Including Standees	Volume/ Capacity Ratio (%)	Load[1] Factor Ratio (%)
San Franciso					
Muni[2] (PM)	47,600	37,100	59,300	80%	128%
BART Daly City[3]	10,700	13,300	16,400	65%	80%
East Bay					
BART-Transbay[3]	23,000	15,700	19,600	117%	146%
AC Transit[4]	13,100	12,300	15,400	85%	106%
North Bay					
GGT-Buses[5]	6,700	9,400	9,400	71%	71%
Ferries[5]	1,200	---	4,000	30%	30%
Peninsula					
CalTrain[6] (AM)	5,500	6,600	6,600	83%	83%
CalTrain (PM)	5,200	6,800	6,800	76%	76%
SamTrans[7]	2,800	2,900	3,300	85%	97%
BART		(see San Francsico)			

[1]Load Factor = Volume - Seats Provided x 100. (Note much more servere overloading occurs on some lines during peak periods within the two-hour period).

[2]From 1981 and 1982 PM peak period load counts reported by Muni as of July 26, 1982 (Source: Department of City Planning, City of San Francisco). Includes only lines crossing Van Ness/11th/Townsend cordon. Capacity includes 1.5 load factor on coaches, 2.0 load factor on Muni Metro.

[3]Transbay passenger volume is 1982 average weekday 7:00-9:00 AM, estimated by MTC. Transbay capacity derived from BART April-June performance report, 2-1/2 hour peak train cycle adjusted to two-hour peak period. Capacity assumes 1.3 load factor in peak hour, 1.15 load factor in balance of peak period. Volume and capacity on Daly City line similarly derived from April-June, 1982 BART Performance Report, adjusted to AM peak period in proportion to Transbay data. Volume greater than capacity because actual number of standees exceeds the 1.3 standee ratio used to estimate capacity.

[4]AC Transit passenger volume from MTC/Caltrans Traffic Survey Series MA-58 (preliminary) for Spring 1982. Capacity derived from three-hour peak counts compiled by AC Transit for 4 months in 1981 and adjusted to two-hour period. Capacity assumes load factor of 1.25.

[5]From May 21, 1982 counts. Includes GGT and red and white fleet ferries. Excludes Club Buses. Capacity assumes no standees, as GGT's objective is to provide a seat for everyone Transbay. Capacity reserve is smaller to the north.

[6]Caltrain Ridership Survey, February 25, 1982. AM and PM peak ridership increased by 6% and 8%, respectively, to represent average day. (Caltrain = Peninsula Commute Service).

[7]From March, 1982 counts. Capacity assumes 1.10 load factor (mainline) and 1.25 load factor (local lines).

carries 2,600 daily riders, of which 800 are Peninsula Commute Service users. A 1980 survey of patrons indicates that the use of the 32 Line by Peninsula commuters has declined since 1975 due to shifts of riders to new routes: the 80 Gateway Express, the 81 Caltrain Express, and the 42 Downtown Loop. These lines parallel the 32 Embarcadero Line several blocks inland from the waterfront traveling from the SP Depot to the Embarcadero Center, Mission Street and northern waterfront areas, respectively.

The Transbay Terminal, the SP Depot and the Ferry Building are major Muni terminal points for numerous bus and trolley coach routes. In addition, several other Muni routes terminate in the northern waterfront area. Cable car service terminates at California and Market Streets and in the northern waterfront area. Muni Metro and BART serve the waterfront via the Embarcadero Station under Market Street. Golden Gate Transit's Financial District bus routes operate along Bay Street and Sansome/Battery to the Transbay Terminal. SamTrans routes terminate in a loop around Mission, Main, Market and Steuart Streets. Golden Gate Transit ferries operate out of the ferry terminal at the foot of Market Street. Peninsula Commute Service is provided to the depot at Fourth and Townsend Streets.

The existing SP Depot at Fourth and Townsend Streets is served by six Muni lines, two of which operate only during the peak hour. In 1981 about 6,600 commuter train passengers arrived and departed from the San Francisco SP Depot each weekday (13,200 trips). Of these, 68% (or almost 4,500 inbound passengers) used Muni to reach their final destinations, while most of the rest walked (Table J.4 in the Downtown Plan EIR indicates that 1981-82 p.m. peak period travel by train included 3,430 work person trip ends (pte) and 1,310 other pte, accounting for one-third of all weekday trips).

Table IV-11 summarizes some of the key operational characteristics of the existing public transit carriers. The San Francisco Municipal Railway operates the most hours. BART and Muni provide more off-peak and weekend service than the other carriers, who primarily cater to commuters. SamTrans is an exception, however, being limited by San Francisco Public Utilities policy to a fixed number of trips per day, which are distributed fairly evenly throughout the day. Muni and BART are the only carriers permitted to serve intra-San Francisco trips.

Table IV-11

OPERATIONAL CHARACTERISTICS EXISTING TRANSIT SERVICE

Point of Origin	Name of Carrier	Type of Service	Typical Weekday Hours of Operation	Typical Headways in Minutes: Weekday Peak	Weekday Base	Weekday Eve	Sat Mid-day	Sun Mid-day	Fare Structure	Transfer Policy and Pass Arrangements
San Francisco	Muni	Bus Trunk	24 hours[1]	4-8	6-12	10-20	4-15	5-15	o Single Zone System o Monthly Fast Pass ($24)	o Free transfer between Muni vehicles for 2 hour period; includes reverse riding
		Bus Local	6 AM - 12:30 AM	8-10	10-15	15-20	8-20	9-24	o $.60 cash fare	o Fast Pass good on BART within San Francisco
		Muni Metro	5 AM - 12:30 AM	—	—	—	—	—		
		Individual Line Subway Combined		6 3	6 3	10 3	8-14 4	10-18 5		
		PCS "Expresses"	Peak Only	5-10	—	—	—	—		
		32 Embarcadero	6 AM - 6 PM	6-8	12	—	20	20		
North Bay	Golden Gate	Bus	5 AM - 2 AM	—	—	—	—	—	o Zone Fare System	o Free transfers within zone
		Ferry Larkspur Sausalito	 7 AM - 6:30 AM 7 AM - 8 PM	 30 80	 120 90	 — —	 120 90	 120 90	o $1.75 min. to Marin	o From Ferry 30¢ transfer to Golden Gate Bus
East Bay	A.C. Transit	Transbay Bus	5 AM - 1 AM (one owl route)	5-30	30	60	60	60	o Zone Fare System o $1.25 min. to East Bay	o Joint Muni/AC pass, add $22 to basic AC pass; thus $67/mo., SF to Berkeley

Table IV-11 (continued)

Point of Origin	Name of Carrier	Type of Service	Typical Weekday Hours of Operation	Typical Headways in Minutes: Weekday Peak	Weekday Base	Weekday Eve	Sat Mid-day	Sun Mid-day	Fare Structure	Transfer Policy and Pass Arrangements
East Bay	BART	Richmond-DC[2] Line	6 AM to midnight	15	15	—	20	—	o Zone Fare System	o From BART 30¢ average transfer to Muni bus
		Concord-DC Line		15	15	20	20	20	o $1.10 min. to East Bay	o From BART 30¢ transfer to AC bus
		Fremont-DC Line		15	15	—	20	—		o Monthly Regional Pass good on AC, BART and Muni
		Combined in SF		5	5	20	7	20		
Peninsula	Peninsula Commute Service	Commuter Railroad	5 AM to 10 PM	20 min. to individual station	120	120	120	120	o Zone Fare System o $1.85 min to leave City, cash o $.96 if monthly ticket	o Free transfer to Samtrans for weekly or monthly ticket holders
Peninsula	SamTrans	Express Bus	5 AM to midnight	30	30	60	30	30	o Zone Fare System	o Free transfer within zone except for reverse riding; 15¢ charge per additional zone
		Local Bus	5 AM to 12:30 AM	8	20	60	30	30	o $.90 SF to Airport	

[1]Bus provides "owl" service.

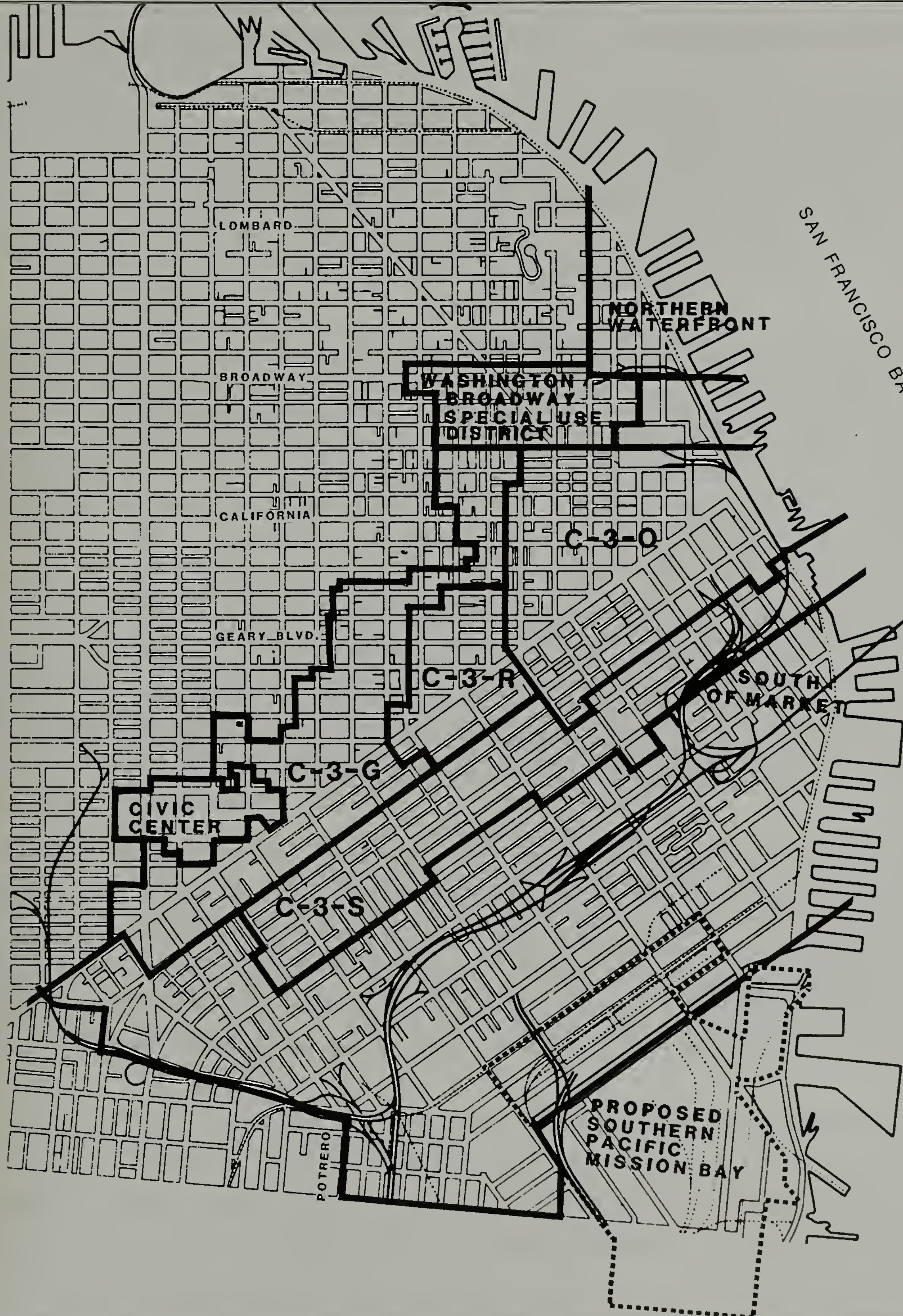
[2]DC = Daly City

b. Projected Transit Demand and Short-Range Transit Improvement Plans

Projections of future transit travel demand into and out of the downtown area assume an increase in downtown employment of 95,700 persons between 1979 and 2000.[16] This is the growth expected if San Francisco maintains its current share of regional growth as estimated by City, ABAG, and MTC staff in the Downtown Transportation Improvement Program (DTIP).[17] The DTIP encompasses areas that have or are projected to experience significant employment growth as shown in Figure IV-20. Since the base period for travel demand analysis is 1982, the DTIP growth projection of 95,700 was reduced to 81,200 to reflect estimated growth in the 1979-82 period.

Using input from the DTIP, downtown employment growth was translated into increased corridor travel demand as follows: First, projected new employees were apportioned among San Francisco and other Bay Area districts based on projected housing growth and downtown worker occupancy rates. (Districts consist of East Bay, South Bay, North Bay and four sectors of San Francisco.) Independent estimates were made for San Francisco and non-San Francisco resident employees, and these were normalized to the total of 81,200 new employees. The San Francisco share is based on a projection of 20,000 net new dwelling units within the City by 2000. Projected new employees by corridor were then converted to daily commuters (i.e., highway and transit travelers only) using factors from observed 1975 travel data. Total new peak two-hour person trips were then estimated by applying ratios of peak period to daily trip-making and ratios of work trips to all trips, by corridor, based on 1981 travel data. Finally, transit shares of peak-period person travel were assigned based on existing mode choice in each corridor. The projected increases in downtown transit demand from each corridor are shown in Table IV-12. The downtown employment growth assumed for travel demand projections differs from the City's Downtown Plan projection.[18] (The Downtown Plan was in progress at the time the travel projections were completed for the I-280 study). The differences are: the Downtown Plan projects an increase of 91,260 jobs between 1984 and 2000 in the City's C-3 district; the DTIP projects an increase of 95,700 jobs between 1979 and 2000 in a larger downtown area which includes the C-3 district. Considering these differences, the Downtown Plan projection could result in an estimated 30% increase in additional downtown transit demand over that shown in Table IV-12.

Planned transit improvements will increase capacity in downtown San Francisco access corridors and help offset projected peak period travel demand increases. Although the



DOWNTOWN TRANSPORTATION IMPROVEMENT PROGRAM STUDY BOUNDARY

SCALE 0 500 1000 2000 FEET

IV-20

year 2000 is the horizon year for travel projections, capacity analysis focuses on the next five years, since this is the period used by transit agencies for programming and funding improvements. Projections of programmed capacity increases are summarized below for each transit agency. They are based on current five-year plans of the agencies and/or discussions with agency representatives.

Municipal Railway: Muni's current Five-Year Plan (1984-1989) projects a net increase of 8-21% in ridership levels into the Central Business District over 1979 levels. Peak-hour service on existing radial lines connecting Muni patrons to the CBD from each of San Francisco's four corridors (Northeast, Northwest, Southeast, Southwest) is projected to increase at a rate of 13% by 1991. Use of express lines, which are more efficient at serving the CBD, will increase service at a faster rate, 16% by 1991.

Muni's Five-Year Plan proposes to extend the Muni Metro from the Embarcadero Station near the foot of Market Street along the Embarcadero Roadway to the existing SP Depot. Its alignment would follow that of the E-Line south of Market and would therefore serve similar trip markets as that segment of the E-Line. The Muni Metro would provide direct service to much of the Financial District, Civic Center and BART.

Muni's Five-Year Plan proposes to utilize I-280 TCP funds to construct a streetcar line (E-line) operating along the Embarcadero roadway from Fort Mason to the existing SP Depot. Muni plans to tie the E-line into the proposed F-Market streetcar line at or south of the Ferry Building. The junction of the E-line and the F-Market line has not yet been determined. The F-line will extend up Market Street to the Civic Center area, or beyond. Both E-and F-lines are planned to utilize 20 historic streetcars for their operation.

BART: BART's current Five-Year Plan (1983-1988) calls for the acquisition of new cars the upgrading and expansion of facilities, and the completion of capital improvement plans. These improvements would allow for a system-wide capacity increase of 40% in 1990 over 1981/1982, and a 37% increase in peak-hour transbay capacity.

AC Transit: AC Transit's current Five-Year Plan does not call for any increase in Transbay capacity, due to financial constraints on the system.

Golden Gate Transit: GGT's Five-Year Plan (1983/84-1987/88) proposes a 5% per year capacity increase which would result in an increase of approximately 30% between 1984-1990 depending on future ridership and funding. GGT also proposes to reinstate a third ferry (existing but not currently in service) on the Larkspur-San Francisco route, increasing Larkspur ferry capacity from 1,450 to 2,050 passengers.

Peninsula Commute Service: Caltrans has on order 63 new passenger cars and 18 new locomotives for Peninsula Commute Service. The new equipment will be phased into service to replace the existing fleet. The phased replacement is expected to be completed by February of 1986. The use of new equipment will enable push-pull operations and significantly improve equipment utilization, operating efficiency, passenger comfort, and capacity. Caltrans' current 5-year plan (1984-1989) for Peninsula Commute Service calls for a service increase from the current 46 daily trips to 52 daily trips by June 1986. This represents a possible increase of 3 additional trips during the two-hour peak period, or a 25% increase in service frequency for the peak period. Service improvements beyond 52 daily trips are anticipated when the planned downtown San Jose and downtown San Francisco terminals are in operation. Caltrans intends to provide adequate capacity through additional equipment acquisition and schedule adjustment to meet and encourage demand.

SamTrans: SamTrans plans to expand its fleet by about 50 buses over the next seven years.[19] New service would most likely be assigned to San Francisco runs. A capacity increase of up to 3,450 passengers (50 buses x 1.5 trips per bus x 46 seats) is possible. For purposes of this report the previous DTIP capacity estimate of 2,800 additional passengers over the next five years will be used. This is not inconsistent with the 15% increase projected in the Downtown Plan EIR.

c. Corridor Capacity and Projected Demand

Taking into account the Five-Year plans for each transit agency, the projections to year 2000 of peak period transit passengers were added to existing conditions and compared to the planned capacities (see Table IV-12). These are baseline projections; lower and upper bounds were also projected.[16] In general, the table indicates that several of the transit systems could absorb additional passenger ridership, albeit at a lower level of service than today and probably all in the "shoulders" of the peak period. Potential impacts on peak-period travel into downtown San Francisco are discussed below for each of the four access

Table IV-12

COMPARISON OF PROJECTED TRANSIT DEMAND AND CAPACITY[1]
Two-Hour A.M. Peak Period Person Trips Into Downtown San Francisco

	Existing Capacity	Programmed Additional Capacity	Total 1987 Capacity[2]	Existing Demand	Add'l Demand to Year 2000	Total 2000 Demand (Unconstrained)	Reserve Capacity[5]
San Francisco							
Muni (P.M.)	59,300	4,200	63,500	47,600	6,600[3]	54,200[3]	9,300
BART-Daly City	16,400	11,300	27,700	10,700	1,800	12,500	15,200
East Bay							
BART-Transbay	19,600	13,000	32,600	23,000	6,400	29,400	3,200
AC Transit	15,400	None	15,400	13,100	5,100	18,200	-2,800
North Bay							
GGT-Bus	9,400	(25%)	11,800	6,700	2,100	8,800	3,000
Ferries	4,000	600	4,600	1,200	500	1,700	2,900
Peninsula							
Caltrain[4]	6,600	1,600	8,200	5,500	1,400	6,900	1,300
SamTrans	3,300	2,800	6,100	2,800	600	3,400	2,700
BART (see S.F.)							

[1] Based on continuation of current mode splits. Excludes non-CBD growth. Source: Final Working Paper 1.5.6, page 11-9.

[2] Line capacity; does not reflect possible capacity limitations at stations. Based on current 5-Year Plans of each agency.

[3] Excludes intra-downtown trips not crossing study area cordon, and feeder trips to other transit systems.

[4] Assumes existing SP terminus at 4th/Townsend. (Caltrain = Peninsula Commute Service).

[5] Note that these are totals for a two-hour period and that greater capacity deficiencies are anticipated for individual lines and for shorter times, such as the peak hour and peak half-hour periods.

corridors. These potential impacts differ from those discussed in the Downtown Plan EIR since the data bases and study areas are different. Also, the Downtown Plan EIR looked at P.M. peak period and peak-hour travel, as opposed to A.M. peak period and peak hour conditions examined in this report.

San Francisco Corridor: For downtown access from other parts of San Francisco, sufficient capacity appears available to year 2000 on Muni and BART (assuming completion of currently planned improvements). However, Muni has projected up to a 6% increase in ridership due to increased mode split.[20] Applying this to projected year-2000 transit ridership into downtown would result in an additional 3,300 peak period riders (one way), or a total of 57,500 riders. While this is still below the planned 1987 capacity, the average peak-period load factor would increase from 0.80 today to 0.91. This is a significant degradation from current conditions. To maintain today's load factors, a further 13% capacity increase would be needed into the downtown beyond the existing Five-Year Plan. Muni is currently planning for longer-range system expansion that would absorb this ridership growth. Again, it is stressed that the figures available are totals for the two-hour peak period and that much more severe deficiencies occur on individual lines and for shorter times, such as the peak one-hour or peak half-hour periods.

East Bay Corridor: AC Transit is not projected to have any reserve capacity to absorb additional ridership (and, indeed, may become deficient during the peak two-hour period). BART has programmed substantial capacity increases over the next five years and is also assessing potential for further long-range increases. The initial projections of demand and capacity imply an improvement in load factors over the period. However, non-downtown ridership growth can be expected to use some of the increased capacity.

North Bay Corridor: The North Bay corridor is served by Golden Gate Transit buses and ferries and Red & White Fleet ferries. Sufficient reserve capacity is projected on the bus and ferry systems to absorb projected growth. However, this assumes continuation of current modal split. Additional transit capacity would be required if relief in highway congestion is sought through the Corridor.

Peninsula Corridor: Peninsula Commute Service ridership is projected to increase by 1,400 peak period/peak direction riders (from 5,500 at present to 6,900 by year 2000). This assumes retention of the existing depot at Fourth and Townsend. SamTrans and

respectively. All three systems would have sufficient capacity during the peak period to accommodate this growth.

Several factors are not considered in the baseline projections. First, only downtown growth is being examined. As discussed earlier, the City's Downtown Plan projection of downtown growth could result in an estimated 30% increase over the baseline projections. Second, items not considered include potential shifts toward increased transit mode split and increased ride-sharing due to constrained vehicular and parking capacities, planned transit service improvements (beyond current five-year plans), and higher costs of driving. However, potential mode shifts are discussed in the following section. This could be particularly important in the cases of Muni, BART and Peninsula Commute Service, since most of the systems could handle additional ridership even under the projected conditions discussed above.

2. Traffic and Parking

a. Vehicular Access to Downtown

Existing highway travel into downtown San Francisco is summarized in Table IV-13. Bay Bridge and Golden Gate Bridge vehicular capacities are almost fully utilized at present over a two-hour morning peak period. Both bridges experience slow travel speeds and queuing for periods longer than one hour. The only significant residual capacity for increased a.m. peak-period traffic into San Francisco appears to be on I-280 and on some surface streets. Average auto occupancies during the peak period are also shown on Table IV-13 and indicate that substantial ridesharing currently occurs, particularly on the Bay Bridge.

Year 2000 vehicular volumes were projected similarly to those for transit.[16] No significant capacity increases are programmed for the highway corridors leading into downtown. Table IV-14 summarizes projected vehicular demand and capacity for each corridor, reflecting baseline conditions; lower and upper bounds were also projected. An expanded discussion of each corridor follows.

San Francisco Corridor: For downtown access from other parts of San Francisco, sufficient capacity appears available to year 2000 on the total surface arterial street system, but capacity deficiencies on certain routes can be expected. Muni has projected up to a 6% increase in ridership into/out of the downtown, which would reduce peak-

Table IV-13
EXISTING HIGHWAY TRAVEL TO AND FROM DOWNTOWN SAN FRANCISCO
Two-Hour AM Peak Period/Peak Direction (Unless Otherwise Noted)

	Volume Vehicles	Capacity	Volume[5] Capacity Ratio (%)	Average Vehicle Occupancy
San Francisco (Surface Streets)[1]				
West Cordon	27,400	35,000	78%	
South Cordon	43,600	61,500	71%	
Total	71,000	96,500	74%	1.35
East Bay				
Bay Bridge[2]	18,000	18,000	100%	1.68
North Bay				
Golden Gate Bridge[3]	12,900	14,400	90%	1.39
Peninsula[4]				
U.S. 101	15,200	15,200	100%	N/A
I-280	10,500	11,400	92%	1.40
Total	25,700	26,600	97%	

[1] PM peak=period outbound trips across Metropolitan Traffic District boundaries (approx. Gough, 14th, Townsend). Source: Parking Conditions and Trends, S.F. Dept. of Public Works and Planning, 1975. Cordon totals modified to reflect assumed 1% annual traffic growth to 1982 and loss of capacity due to bus lanes on Mission, Geary and Sutter.

[2] Source: Traffic Survey Series MA57, Metropolitan Transportation Commission and CalTrans, April 1982 (revised November 1982). Estimated capacity is 1,800 vehicles per hour per lane.

[3] Source: Counts by GGBHT, June 1982. Estimated capacity is 1,800 vehicles per hour per lane.

[4] Screenline is taken north of Alemany Interchange. Source: CalTrans counts, 1975 and 1977 (U.S. 101), 1978 (I-280). Capacity is estimated at 1,900 vehicles per hour per lane.

[5] Worse conditions can be found during the peak one-hour and peak half-hour periods and on certain surface streets..

Table IV-14

COMPARISON OF PROJECTED VEHICULAR DEMAND AND CAPACITY

A.M. Peak Period Vehicle Trips, Assuming Continuation of Existing Mode Split

Corridor	Existing Volume	Additional[1] Persons by Auto	Average Occupancy	Additional Vehicle Demand	Total Future Vehicle Demand	Existing/Future Capacity	Future[4] Reserve Capacity
San Francisco MTD Boundary (All Streets-P.M.)	71,000	4,900[2] 4,200[3]	1.35 1.39	36,000 3,100	77,700	96,500	18,800
East Bay Bay Bridge	18,000	8,100	1.68	4,800	22,800	18,000	-4,800
North Bay GG Bridge	12,900	4,200	1.39	3,100	16,000	14,400	-1,600
Peninsula U.S. 101/I-280	25,700	6,600	1.40	4,700	30,400	26,600	-3,800

[1] Carpoolers and non carpoolers

[2] All person-travel by auto to downtown from other parts of San Francisco. (Intra-downtown travel is excluded because trips do not cross MTD boundary.)

[3] All person-travel by auto to downtown from North Bay. (Trips cross west MTD boundary.)

[4] Worse conditions can be expected during peak one hour and peak half hour periods and on certain surface streets.

period auto trips across the corridor by 2,400 trips. On the other hand, diversion of about 1,600 Peninsula freeway trips to surface streets is projected due to U.S. 101/I-280 capacity constraints (see below).

East Bay Corridor: This appears to be the critical corridor in terms of future capacity needs. The Bay Bridge is projected to be deficient by 1.3 lanes (2,400 vehicles per hour) over the entire two-hour peak period. It is projected that up to 1,200 vehicles can be accommodated by lengthening of the Bay Bridge peak period. Remaining trips would divert to transit (BART) and carpooling. This would increase average vehicle occupancy from 1.68 at present to 1.74 and bring BART ridership to 14% above its currently programmed capacity. Bay Bridge capacity would be fully utilized over a three-hour period. Non-CBD traffic growth (not readily divertable) would add to the excess demands to be accommodated outside the peak three-hour period.

North Bay Corridor: A two-hour capacity deficiency of 1,600 vehicles is projected (exclusive of non-downtown traffic growth) on the Golden Gate Bridge. Sufficient reserve capacity is projected on the bus and ferry systems to absorb this growth. Of the 3,100 additional vehicle demand, 1,500 are assumed to be added to fill the two-hour peak period to capacity, and the remaining 1,600 vehicles (2,200 persons) would divert to buses and ferries in proportion to existing shares. This would result in diversion of 400 persons to ferries and 1,800 persons to buses.

Peninsula Corridor: This corridor, like the East Bay corridor, has a projected vehicular capacity deficiency equivalent to about one freeway lane in each direction. (Again this is exclusive of any non-downtown traffic growth during the same period.) Of the 4,700 additional vehicle demand to year 2000, up to 900 vehicles (19%) could be absorbed in the peak two-hour period. It is assumed that 1,600 of the 3,800 excess vehicles would divert to surface arterials (e.g., Bayshore Boulevard, Third Street) and that the remaining 2,200 excess vehicles (3,100 person-trips) would divert to public transit and ridesharing in proportion to existing shares. This would result in diversion of 800 person-trips (300 vehicle trips) to carpools, 900 to Peninsula Commute Service, 500 to SamTrans and 900 to BART. This would still leave a slight excess vehicular demand (300 vehicles) to be satisfied outside the peak two-hour period.

Table IV-15 summarizes the modal shifts described above. The unconstrained demand used in Tables IV-14 and IV-15 does not reflect any shift to transit as a result of limited highway capacity. Table IV-15 also includes a constrained demand that accounts for limited highway capacity by shifting trips to transit.

b. **Internal Street System**

Daily and peak-period traffic counts for several surface street intersections were obtained to establish background volume conditions and are summarized in Table IV-16. Manual intersection turn counts were performed at 42 key intersections and machine counts of the amount of traffic were obtained for three screen lines (Figure IV-21). The 42 intersections were selected as representative sites for impact analysis. The intersection of Stockton Street and Broadway was added later in the analysis. Several intersections operate at deficient levels of service ("E") during the evening peak period: Montgomery/Market, First/Mission, Beale/Mission, First/Harrison, Sterling/Bryant, and Sixth/Brannan (see Table IV-17 for level of service definitions). The major difference between existing and projected year-2000 traffic conditions under the No Project Alternative is the extension of peak traffic conditions at some congestion points from 1-2 hours to 2-3 hours.

The Embarcadero roadway is the only continuous north-south roadway in the study area. All other routes cross Market Street and are not continuous from the South Beach area to Fisherman's Wharf. The Embarcadero roadway presently has four travel lanes without medians and carries approximately 22,000 vehicles per day. Average travel speeds range from 25 to 30 miles per hour (mph) near Fisherman's Wharf to 30-35 mph south of the Bay Bridge.

Table IV-18 summarizes the peak-hour ramp volumes for the morning and evening peak hour. By the year 2000 the duration of peak-hour traffic would be extended to beyond two hours due to bottlenecks upstream of the Embarcadero Freeway constraining peak hour freeway off-ramp demand. Currently the Embarcadero Freeway ramps at Broadway, Clay and Washington, and Folsom and Fremont, in combination, carry 2,100 vehicles northbound (off) and 2,570 vehicles southbound (on) during the p.m. peak-hour, a total of over 4,600 vehicles.

Table IV-15

POTENTIAL EFFECTS OF HIGHWAY CAPACITY CONSTRAINTS ON CORRIDOR VOLUMES

Two-Hour A.M. Peak Period

	Units	1987 Capacity	Year 2000 Demand Unconstrained	Year 2000 Demand Constrained
San Francisco				
Muni	Pass'rs	63,500	57,500[1]	57,500
Surface Streets	Vehicles	96,500	75,300[1]	76,900[2]
East Bay				
BART	Pass'rs	32,600	29,400	37,200
AC Transit	Pass'rs	15,400	18,200	15,400
Bay Bridge	Vehicles	18,000	22,800	19,200
North Bay				
GGT-Buses	Pass'rs	11,800	8,800	10,600
Ferries	Pass'rs	4,600	1,700	2,100
Golden Gate Bridge	Vehicles	14,400	16,000	14,400
Peninsula				
Caltrain[3]	Pass'rs	8,200	6,900	7,800
SamTrans	Pass'rs	6,100	3,400	3,900
BART	Pass'rs	27,700	12,500	13,400
U.S. 101/I-280	Vehicles	26,600	30,400	26,900

[1] Reflects projected 6% Muni ridership growth across cordon due to modal shift from autos to Muni. This explains the difference from the Muni 'Total 2000 Demand' figure in Table IV-12.

[2] Represents shift of 1,600 vehicles from U.S. 101/I-280.

[3] Assumes existing SP terminal at Fourth and Townsend. (Caltrain = Peninsula Commute Service).

Table IV-16
SURFACE STREET VOLUMES

Street	Cross Street	Direction	ADT	PM Peak Hour	Count Date
Broadway	Tunnel	E	15,700	840	4/80
		W	14,500	1,570	4/80
The Embarcadero	Market	N	10,150	1,220	6/80
		S	11,250	1,250	6/80
Fremont	Mission	N	12,100	1,030	4/80
Franklin	California	N	26,000	2,420	3/81
Gough	California	S	13,700	1,000	3/81
Kearny	Jackson	N	11,300	1,120	10/81
Market	Beale	E	9,200	810	8/80
	Beale	W	6,600	480	8/80
Mission	Second	E	9,900	840	8/80
		W	8,500	670	8/80
Stockton	Pacific	N	3,300	290	5/81
		S	4,900	370	5/81
Van Ness	California	N	20,300	1,840	3/81
		S	25,400	1,470	3/81
First	Howard	S	11,500	1,140	2/81
Third	Bryant	N	21,300	1,650	4/80
Fourth	Brannan	S	7,900	760	2/81
Fifth	Howard	N	10,300	780	2/81
		S	7,900	610	2/81

Source: Traffic Engineering Division, Department of Public Works, City and Country of San Francisco

KEY INTERSECTION AND SCREEN LINE LOCATIONS

SCALE 0 800 1600 2400 FEET

SCREEN LINE

INTERSECTIONS

IV-21

Table IV-17
LEVEL OF SERVICE DEFINITIONS

Level Of Service	Description	Average Vehicle Delay (Seconds)	Volume to Capacity Ratio
A	**Free Flow.** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Insignificant delays.	0-16	0.0-0.59
B	**Stable Operation.** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. Minimal delays.	16-22	0.60-0.69
C	**Stable Operation.** Major approach phase may become fully utilized. Most drivers feel somewhat restricted. Acceptable delays.	22-28	0.70-0.79
D	**Approaching Unstable.** Drivers may have to wait through more than one red signal indication. Queues develop but dissipate rapidly, without excessive delays.	28-35	0.80-0.89
E	**Unstable Operation.** Volumes at or near capacity. Vehicles may wait through several signal cycles. Long queues form upstream from intersection. Significant delays.	35-40	0.90-0.99
F	**Forced Flow.** Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections. Excessive delays.	40 or greater	1.00 and above

Source: "Highway Capacity Manual," Highway Research Board, Special Report No. 87, Washington, D.C., 1965.

"Interim Materials on Highway Capacity," Transportation Research Board, Circular No. 212, Washington, D.C., January 1980.

Table IV-18
RAMP VOLUMES

Freeway/Direction	Type	Location	AM Peak Hour	PM Peak Hour	Date
Embarcadero Freeway (SR-480) Southbound	ON	Broadway	1,310	1,330	6/82
		Clay	960	1,240	6/82
Embarcadero Freeway (SR-480) Northbound	OFF	Broadway	1,760	1,320	3/80 & 6/82
	OFF	Washington	1,620	780	3/80 & 6/82
I-280 Northbound	OFF	Fourth	2,040	950	1/81
		Sixth	2,800	1,460	2/81
I-280 Southbound	ON	Sixth	960	3,730	2/81
I-80 Westbound	OFF	Fremont (Folsom/Howard)	1,290	N/A	3/80
		Fremont(Harrison)	870	250	3/81 & 3/80
		Main[1]	1,710	576	4/81
		Fifth	1,070	1,690	2/81
	ON	Fourth	710	1,840	3/81
		Seventh	270	990	1/81
I-80 Eastbound	ON	Fifth	1,130	1,135	3/81
		Sterling	400	1,000	6/82
		First/Essex	360	1,920	8/76
		Beale[1]	810	1,270	9/80
	OFF	Fourth	2,000	940	3/78 & 3/80

Sources: Caltrans, City and County of San Francisco, and DKS Associates.

[1]Ramp volume includes Bayshore Freeway and Bay Bridge.

c. Parking

Within the vicinity of the project area there are over 28,000 off-street parking spaces. Parking is most heavily utilized in the Financial District during weekdays (over 90% occupied) and in the Fisherman's Wharf area on weekdays and weekends (90% and 100% occupied, respectively). Figure IV-22 summarizes the amount and occupancy of off-street parking within the project area.[21]

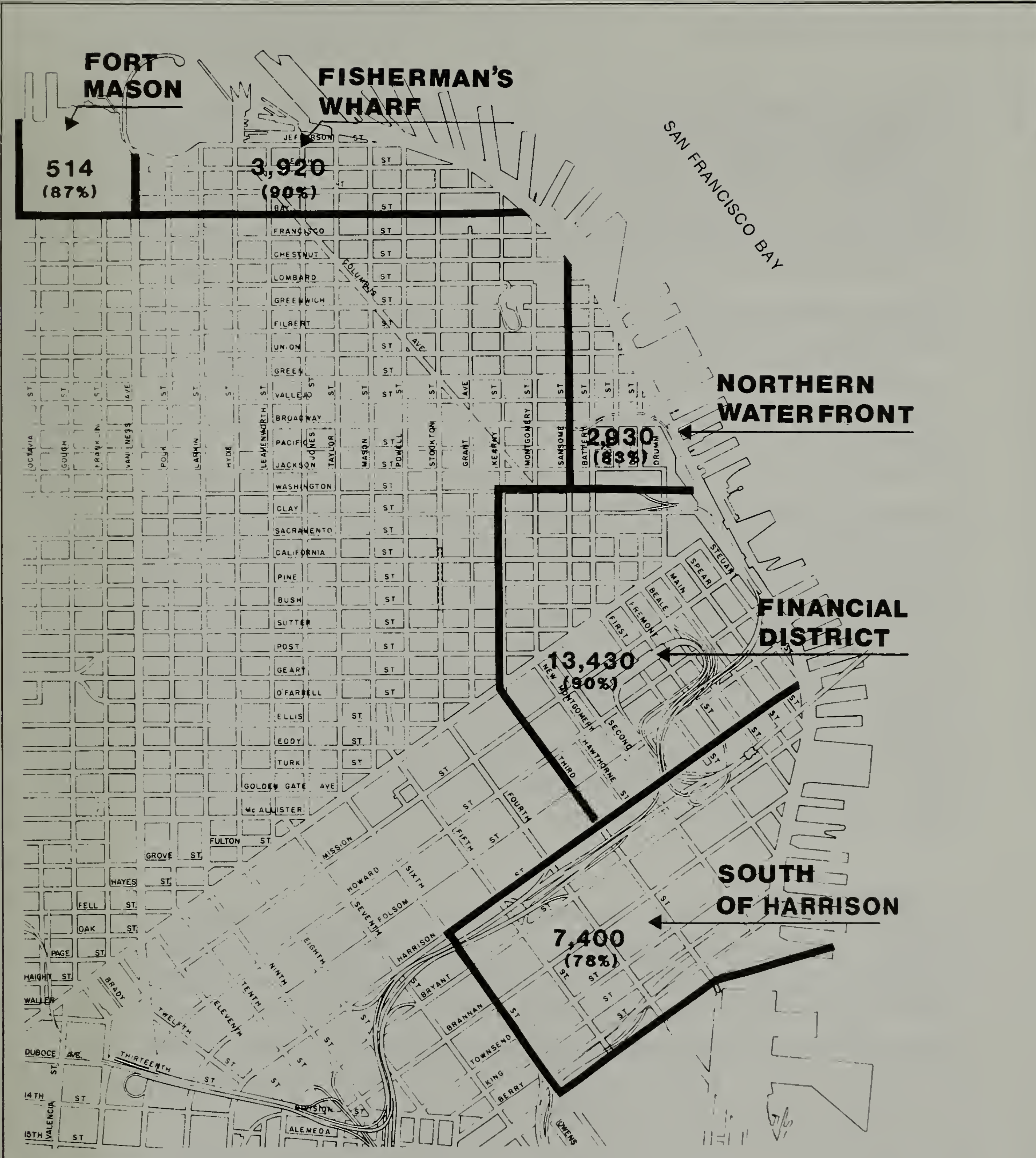
Along the Embarcadero roadway there is an assortment of metered on-street parking stalls, reserved spaces for the Port of San Francisco and parking adjacent to piers. There are approximately 300 on-street and 860 off-street parking spaces along the Embarcadero roadway.

Currently there are no formally designated peripheral parking lots in the project area.

3. Pedestrian and Bicycle Circulation

Within the project area there are three primary pedestrian activity centers: Fisherman's Wharf, the Ferry Building and the SP Depot. The Fisherman's Wharf area has high pedestrian volumes from tourist and recreational activities, especially between Pier 39 and Ghirardelli Square. A particularly critical location is the north sidewalk of Jefferson Street between Taylor and Jones Streets where the sidewalk is severely constricted by street furniture and street merchants. Another critical location is at the intersection of Jefferson Street and Taylor Street, which is the focal point of Fisherman's Wharf. During peak hour operations, over 4300 people use the crosswalks at Jefferson and Taylor Streets resulting in congested pedestrian flow.[22]

Pedestrian movement across the Embarcadero roadway is greatest near the Ferry Building between the Golden Gateway, Muni turnaround, waterfront promenade and Ferry terminal. The crosswalk between Justin Herman Plaza and the Ferry Building experiences the heaviest pedestrian flows, which peak when Golden Gate ferries arrive in the morning (five-minute volumes of 300 people at 8:15 a.m.). The largest single-hour pedestrian volumes occur in the evening (4:30-5:30 p.m.), with 2,000 people crossing the Embarcadero roadway at the foot of Market Street.[23] These peak pedestrian crossings create impeded or constrained flow regimes near the Ferry Building.[24]



OFF STREET PARKING SUPPLY
(Peak Weekday Utilization)

514 ← NUMBER OF AVAILABLE SPACES
(87%) ← AND PERCENT OCCUPIED

IV-22

Approximately 6,600 passengers arrive at and depart from the SP Depot at Fourth and Townsend each weekday.[25] Of these, almost 30% walk to their final destination while the rest use Muni or other means of transportation (taxi, jitney, auto). Pedestrian activity peaks during the morning and evening commute periods with flow conditions becoming impeded near the Depot and on the crosswalks at Fourth and Townsend Streets.

Generally, excepting sidewalks, there is no defined pedestrian way through the project area. There are 22 crosswalks along the Embarcadero roadway, of which 5 are signal controlled. Except for the Waterfront promenade and the grade-separated crossing between Pier 39 and its garage, there are no special provisions for pedestrians in the project area.

Presently there are no formal bicycle lanes along the Embarcadero roadway, so cyclists must share the road with vehicular traffic. Poor road conditions and several railroad spur track crossings of the Embarcadero roadway make bicycle travel difficult. The adopted Recreational Element of the Bikeways Plan calls for a Class I bicycle route (off-road) along the Embarcadero roadway connecting to Class III routes (signs only) to the south (Townsend, Third and Fourth Streets) and north (Beach Street).[26] The Embarcadero roadway is not included in the Commute Element of the Bikeways Plan; however, Second, Third, Berry and Townsend Streets in the southern study area and North Point and Bay Streets (only some portions west of Columbus Avenue) in the north are part of the commute route system.

4. Goods Movement

Truck service to the waterfront is primarily via the Embarcadero roadway, which provides continuous north-south circulation in the project area. Access between the Embarcadero roadway and the piers is unrestricted due to several curb cuts and no medians along the roadway. Routes have been identified for trucks to access the Embarcadero roadway from the Bay Bridge, Bayshore and I-280 Freeway.[27] These routes include Battery, Fremont/Folsom, Harrison, Bryant, Brannan, Townsend, Berry and Third Streets. Port studies indicate that current truck traffic on the Bay Bridge bound for the waterfront area will double in the near future, necessitating the maintenance of access to avoid disruption of Port activities.

Most goods movement in the project area is related to maritime and commercial activities. In the Fisherman's Wharf area, truck service is most evident for fish processing businesses along Jefferson Street and commercial service requirements for Cost Plus Imports and Del Monte Frozen Foods along North Point Street. Port activities generate truck traffic all along the waterfront including the Break-bulk Terminal (Piers 27-29), Foreign Trade Zone, Newsprint Terminals (Piers 15-17 and 48) and Delta Lines Terminal. In the southern project area, King Street serves adjoining warehouses, distribution companies and small manufacturing plants which all require truck service. Trucks frequently load and unload on King Street between Second and Third Streets.

The waterfront area is served by three transcontinental railroads -- Southern Pacific, Western Pacific and Santa Fe[28] -- and by the Belt Line railroad which is owned and operated by the Port of San Francisco. All three transcontinental lines have marshalling yards near the waterfront, and the Belt Line railroad provides exclusive switching service for freight cars moving to and from the port's piers and terminals. Belt Line locomotives move approximately 75 freight cars a year along the waterfront.[29] SP is the largest carrier of rail cargo out of the Bay Area and it has a direct route east that crosses the South Bay. Western Pacific's marshalling yard and connection with the Belt Line railroad is on the north side of Islais Creek Channel adjoining the Army Street Terminal. Eastbound rail cars move directly from the yard to ferryboats. Their ferries operate from Pier 52. The Belt Line maintains 60 miles of line, spurs, piers and track yardage along the Embarcadero roadway. It switches cars from direct line connections and three railroad ferries to all piers and nearby warehouses.

In keeping with the Port of San Francisco's commitment to maintaining rail service to the northern waterfront, the Port has been actively promoting maritime uses. A recent agreement with the Port has permitted Marina Terminals to increase activity at Piers 27-29, potentiatlly generating up to 200 rail cars per month in additional rail traffic. Continued rail access may also be required to support possible development of Piers 30-32 into an auto terminal.

D. PHYSICAL ENVIRONMENT

1. Soils, Geology and Seismic Risk

The Embarcadero Corridor is at about ten feet above mean sea level (msl) in the China Basin segment. It rises to about +15 feet msl through the South Beach/Rincon Hill segment and drops to about +8 feet msl through the Ferry Building area, Piers 9-35 and Fisherman's Wharf segments. The Corridor rises to about +25 feet msl at the railroad tunnel in the Fort Mason/Aquatic Park segment.

The entire Embarcadero Corridor lies on artificial fill except for the Fort Mason/Aquatic Park tunnel which passes through Franciscan Assemblage sandstone.[30] Artificial fill was dumped along the north and east tidal flats of San Francisco to provide flat land as early as 1850.[31] The amount of fill used along most of the Corridor varied between 10 and 30 feet with fill depths to about 50 feet in the Piers 9-35 segment. Fill material consisted of dune sand, rubbish, quarry wash, building debris and timber from various sources. Most of the Corridor was filled following the construction of a seawall along the Embarcadero roadway in the late 1800s. The China Basin segment was not completely filled until the 1920s.[32] The present seawall underlies the seaward edge of the Embarcadero roadway (see Figure IV-23).

Younger Bay Mud,[33] a soft, compressible mixture of silty clay, sand and shells, underlies the artificial fill. The thickness of the mud varies widely, partly due to the occurrence of ridges and valleys on the underlying bedrock surface and partly due to the mud's capability of flowing out from under heavy loads of fill. The greatest thickness of Bay Mud occurs at the mouth of China Basin Channel (85 feet), in the Ferry Building area (100 feet) and from Piers 9 to 23 (80 feet). At least 20 feet of mud underlies most of the Embarcadero Corridor except for the Fort Mason/Aquatic Park segment which contains 5 to 15 feet of mud.[32]

Below the Bay Mud is a sequence of stiff sandy clays and dense sands (possibly the Colma Formation)[34] which extends to the surface of the Franciscan Assemblage bedrock. The bedrock consists of shale, sandstone and serpentine and varies between -50 and -150 feet msl in the China Basin segment. Along the rest of the Corridor bedrock elevations are as follows: -40 to -100 feet msl in South Beach/Rincon Hill; -100 to -280 feet msl in the Ferry Building area; -70 to -110 feet msl in Piers 9-35; -100 to -150 feet msl along Fisherman's Wharf; -45 to -60 feet msl at Fort Mason/Aquatic Park.

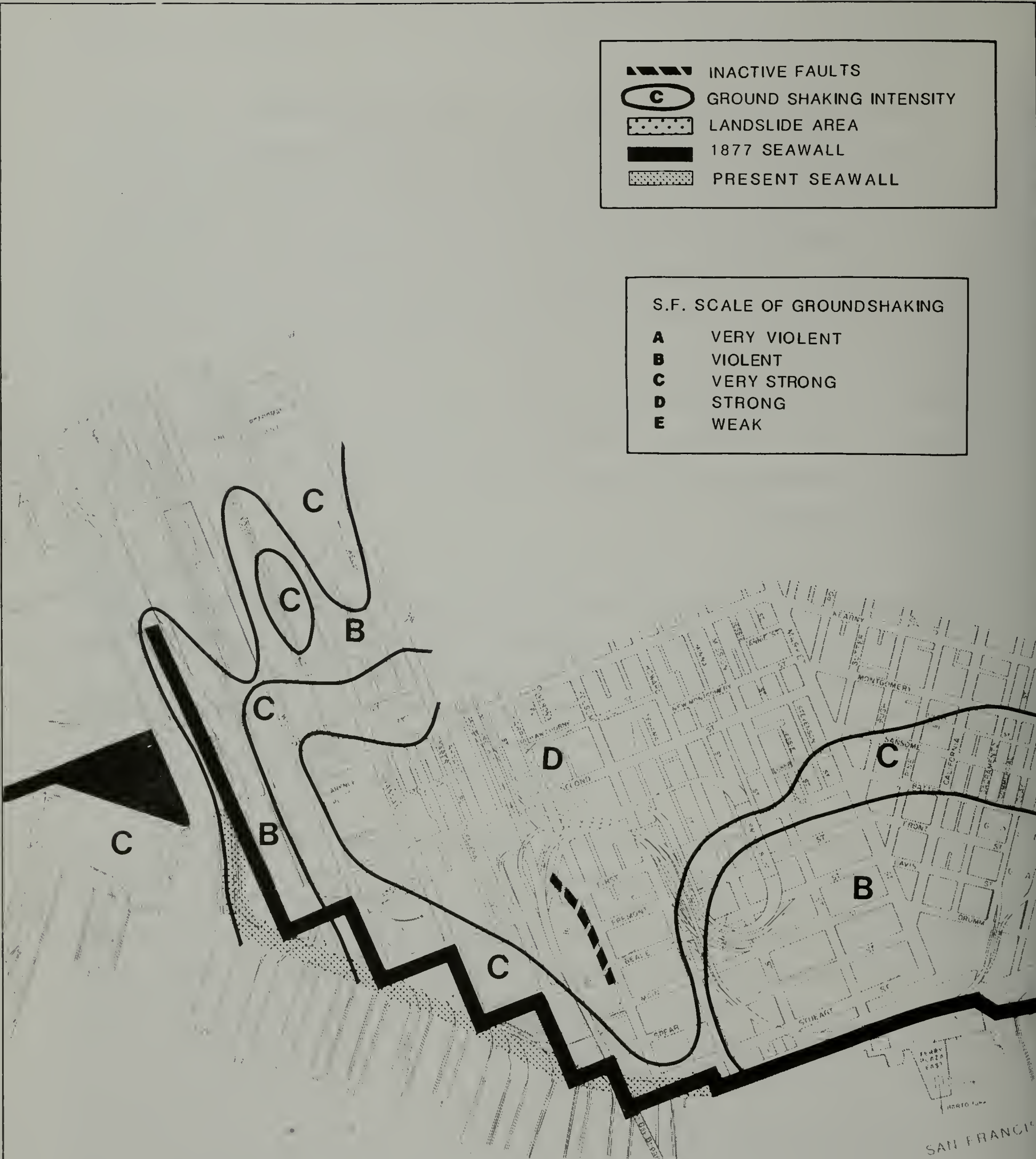
No known active faults cross the Embarcadero Corridor and it is remote from areas of steep slopes susceptible to rockfalls and landslides.[32] Inactive faults occur on Rincon Hill and Telegraph Hill.[31] There are four major fault zones in the San Francisco Bay Area (Figure IV-24) capable of causing violent ground motion along the Corridor (Figure IV-23). The San Andreas and Seal Cove Faults are located off the Pacific shore 10 miles and 15 miles, respectively, from the project area. The Hayward and Calaveras Faults are 10 and 20 miles east of the site, respectively.[35] Each of these systems is considered active and is capable of generating a major earthquake (greater than magnitude 7 on the Richter scale)[36] during the projected useful lifetime of any structure along the Embarcadero Corridor (at least 50 years). Since 1850 there have been five destructive earthquakes (magnitude greater than 5.0 on the Richter Scale) in the Bay Area. Ground settlement and lateral spreading occurred at several locations along the Corridor during the 1906 San Francisco earthquake.[37]

Much of the Corridor is in an area of potential liquefaction, subsidence and inundation hazard (Figure IV-25). Violent groundshaking during a great earthquake (Richter magnitude 8+) can cause liquefaction and settlement of loose soils, such as fill. In addition, the fill over Bay Mud will cause an amplification of seismic shaking. Inundation could result from tsunamis[38] (great sea waves) which can produce very rapidly rising tides along the San Francisco coast.[39] The area between Pier 43-1/2 and Fort Mason is also subject to flooding in the event of failure of the Francisco Street or Lombard Street reservoirs.

URS/John A. Blume estimated the potential 200-year run-up due to a 20-foot high tsunami at the Golden Gate Bridge.[40] Garcia and Houston have estimated the elevation of tsunami wave height along the Embarcadero Corridor for the 100- and 500-year events.[41] The entire Embarcadero Corridor is above the 100-year event. The area from Fort Mason to Green Street (Pier 15) is about 2.5 feet lower than the estimated run-up height of the 500-year event. The area from Green Street (Pier 15) to Rincon Point is about 1 foot below the estimated run-up height of the 500-year event. The remainder of the Corridor is above the 500-year tsunami run-up height.

2. Hydrology and Water Quality

Prior to extensive landfilling beginning in the 1800s, much of the Embarcadero Corridor was part of San Francisco Bay. The original shoreline formed typical cusp-shaped embayments or coves between rocky headlands. The unmodified hydrology was originally

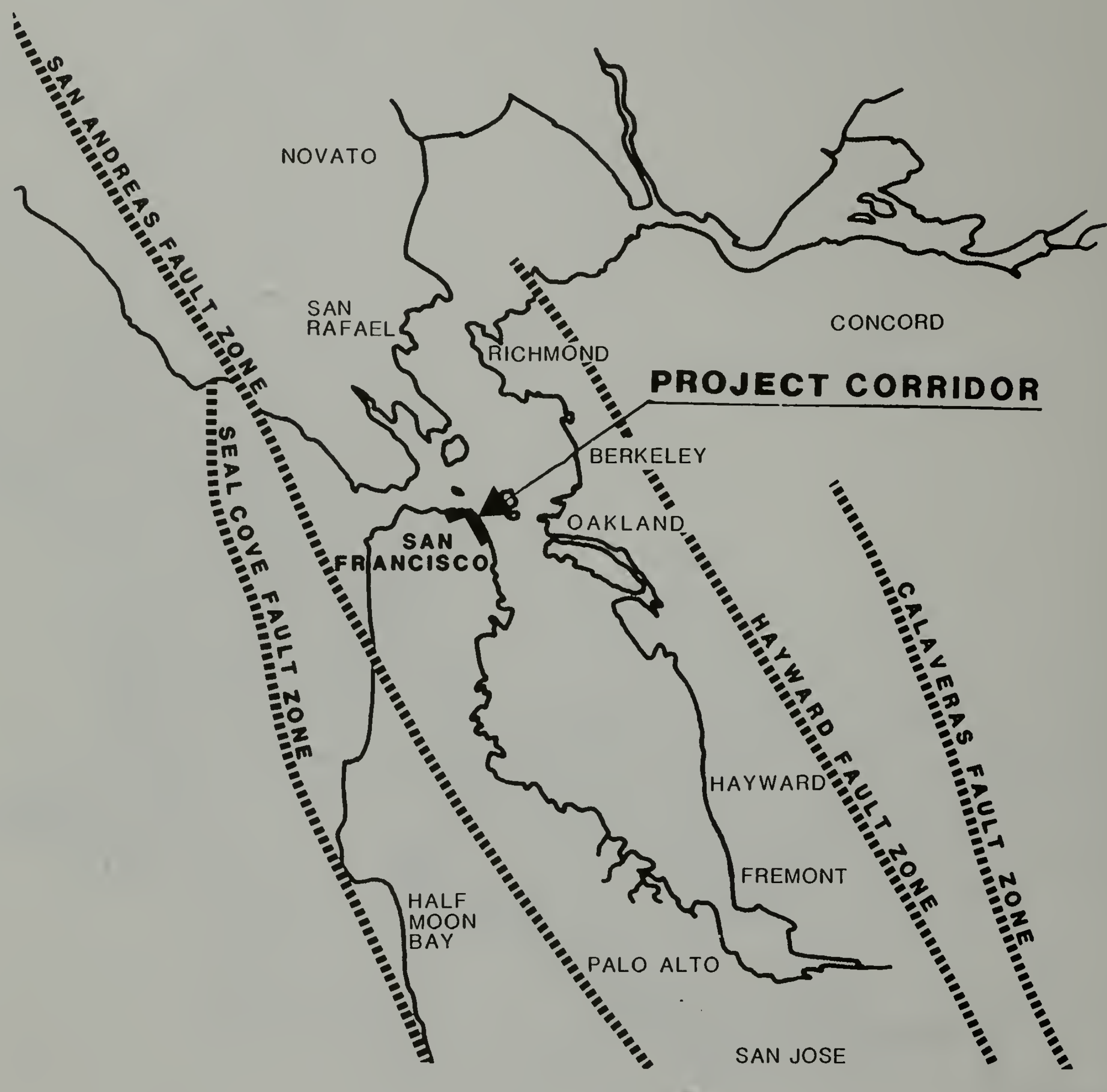


GEOLOGICAL HAZARDS I

(1) WOOD, H.O., REPORT OF THE STATE EARTHQUAKE INVESTAGATION COMMISSION, CARNEGIE INSTITUTE WASHINGTON PUB. 87, 1908, p. 220-245.
(2) URS/JOHN BLUME SAN FRANCISCO SEISMIC SAFETY INVESTIGATION, JUNE, 1974, FIGURES 2 AND 3

IV-23

GEOLOGICAL HAZARDS I



ACTIVE FAULT ZONES IN THE SAN FRANCISCO BAY AREA

SCALE 0 4 8 15 MILES

SOURCE: CALIFORNIA DIVISIONS OF MINES AND GEOLOGY DATA MAP 1, 1975

IV-24

shallow, marine water with depths along the Corridor varying from zero feet near the shoreline to about 20 to 30 feet in the center of the embayments. The water within the fill was originally marine, possibly diluted somewhat by rainfall.

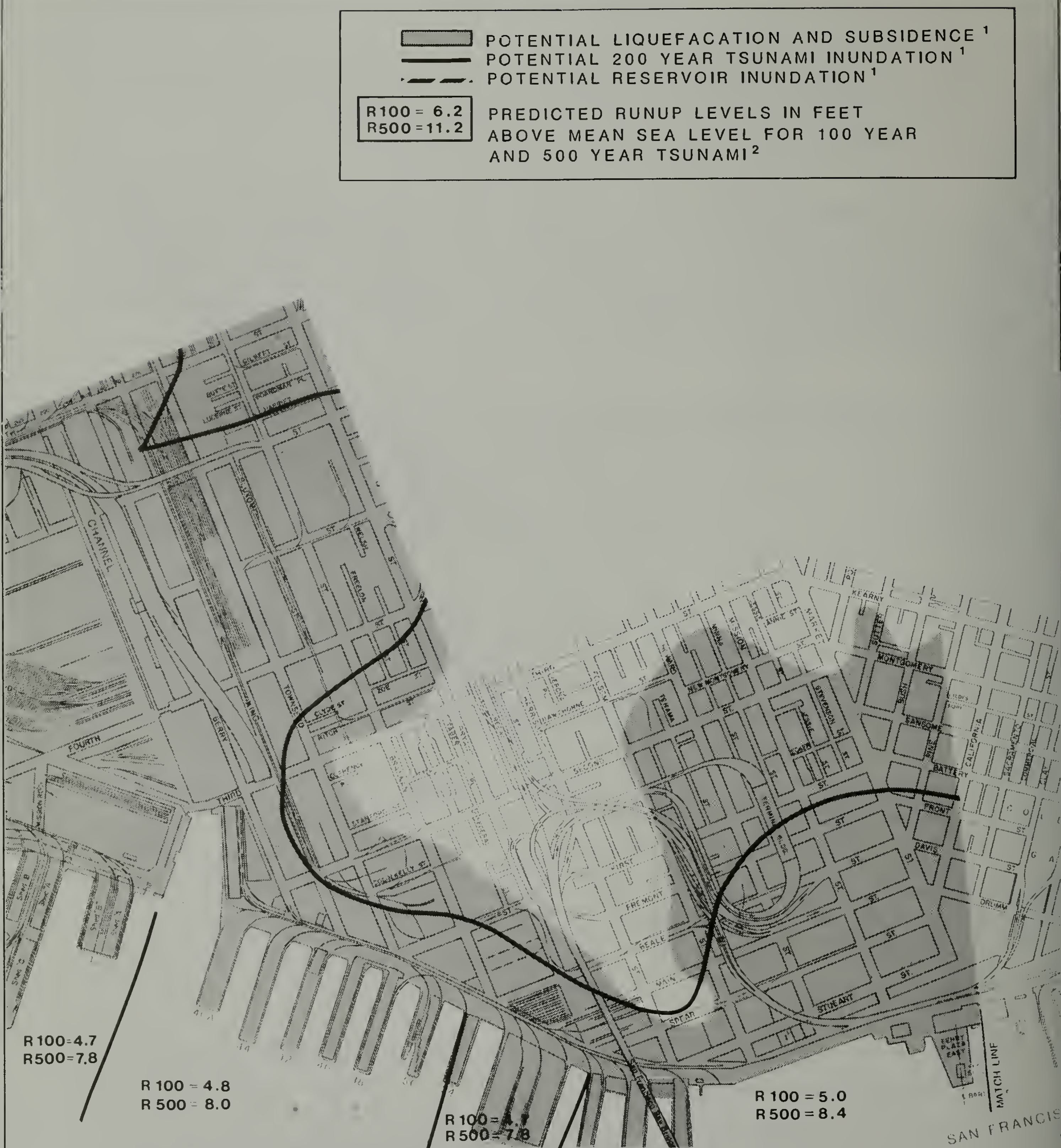
The Embarcadero Corridor is almost entirely covered by impervious surfaces (asphalt, concretes and/or structures). It is relatively flat because it is on man-made land and most high points have been leveled.[42] All drainage channels into the Corridor and runoff from streets, structures and landscaped areas have been controlled and are directed into the San Francisco combined storm/sewer system.

Groundwater elevation along the Corridor is near mean sea level. Near the seawall and where rubble fill is relatively permeable, the groundwater level exhibits minor tidal fluctuations.[43] The groundwater along the Corridor is almost entirely brackish[44] to saline except under Fort Mason, where groundwater is fresh.[45] This fresh water table is above the grade of the railroad tunnel.[46]

The quality of the surface water in the Bay along the Corridor varies laterally and throughout the year. Discharges of raw sewage which occur during winter storms have the greatest effects on blind inlets, such as the channel at China Basin. The effect is less where water circulation is much better, such as Black Point near Aquatic Park.

Mixing by circulation is apparent in coliform measurements.[47] The median value of coliform near Black Point for all of 1979 was about 1000 per 100 ml based on 31 samples of surface water in the bay. In contrast, the median values of 37 surface water samples from just inside and halfway up the China Basin Channel for all of 1979 were 2,400,000 and 13,000,000 per ml, respectively.[48] During the dry season the water quality along the Corridor typically remains the same as that of bay water. Where tidal flushing and mixing occur in the China Basin Channel, the water quality is similar to that of bay water.

Surface runoff is collected by the combined storm/sewer system. The eastside collection and treatment system extends the entire length of the Embarcadero Corridor and has a capacity of 46 million gallons before reaching an overflow condition. The system was begun prior to World War II, and the treatment plants were completed in 1952. The system has been undergoing major improvements and additions during the last five years. A pump station has been added to the North Point Plant to move sludge through a three-



GEOLOGICAL HAZARDS II

SOURCE: (1) URS/JOHN A. BLUME, SAN FRANCISCO SEISMIC SAFETY INVESTIGATION, JUNE, 1974, FIGURES 5, 7 AND 9

(2) A.W. GARCIA AND J.R. HOUSTON, TYPE 16 FLOOD INSURANCE STUDY, U.S. ARMY CORPS OF ENGINEERS TECHNICAL REPORT H-75-17, 1975, FIGURES 55 AND 56

Keep Inside EIR

I·280 TRANSFER CONCEPT PROGRAM

SEE NEXT PAGE FOR INDEX

October 9, 1984

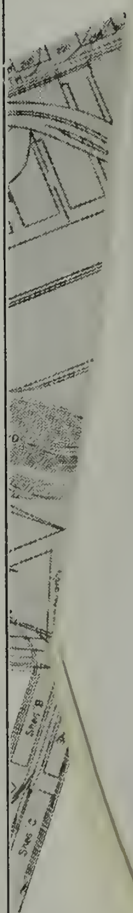
Draft Environmental Impact Report
Distribution List

Attached for your review and comment is the I-280 Transfer Concept Program Draft Environomental Impact Report. You are invited to attend a public hearing on the document to be held on Thursday, November 15, 1984, 7:30 P.M., at the Marina Middle School Auditorium, 3500 Fillmore Street in San Francisco.

Sincerely,

R. D. SAYRE
Project Manager

RUSSELL SAYRE, PROJECT MANAGER · P.O. BOX 7310 · SAN FRANCISCO, CA 94120



R 10
R50

GE

SOUR

all reports are in
T900
XT2
(phase no.)
oversize repts. kept in
3/oversize
T900
XT2
(phase no.)

I-280 TRANSFER CONCEPT PROGRAM

INDEX OF
TECHNICAL MEMORANDA AND WORKING PAPERS

Background Reports to the
DRAFT ENVIRONMENTAL IMPACT REPORT

Publication Date: September 28, 1984

REPORT NO.	REPORT TITLE	DATE
PHASE I		
1.1.1	Data Collection	4/14/82
1.1.2	Refined Project Work Program & Schedule	4/20/82
1.2.1	Key Interviews/Identification of Concerned Groups	6/18/82
1.2.1 Suppl.	" " " " " "	9/18/82
1.2.2	Document Community Issues and Concerns	6/18/82
1.2.2 Suppl.	" " "	9/21/82
1.2.3	Detailed Program for Public Involvement	6/25/82
1.3	Long List of Alternatives	5/3/82
1.3.2	Alternatives Definition Criteria	4/19/82
1.3.5	Initial Screening Process to Select Phase I Alternatives	8/25/82
1.4.1	Project Goals & Objectives	5/10/82
1.4.1 Suppl.	" " " " , Revision No. 1	6/14/82
1.4.7	Evaluation Methodology for Phases I and II	6/18/82
1.5.1	Travel Demand Forecasting/Analysis Procedures	5/7/82
1.5.2	Data Collection	6/30/82
1.5.4	Order-Of-Magnitude Travel Forecast	7/27/82
1.5.6	Travel Demand Forecasting/Analysis	7/8/83
1.6	Documentation of the Scoping Process	6/18/82
1.7.2	Recommended Phase II Alternatives	8/25/82
1.8.1	Outline - Phase I Final Report	7/1/82
1.8.2	Phase I Final Report	12/31/82
PHASE II		
2.1.1	Narrative Description and Sketch Plans of Alternatives I - VI (oversize rept.: 11 x 17)	11/24/82
2.2.1a	Conceptual Designs and Engineering Feasibility for Alternatives I - III (oversize rept.: 11 x 17)	12/31/82
2.2.1b	Conceptual Designs and Engineering Feasibility for Alternatives IV - VI (oversize rept.: 11 x 17)	2/9/83
2.1.1, 2.2.1a & 2.2.1b Resp.	Responses to Comments on Working Papers 2.1.1: Narrative Description & Sketch Plans of Alternatives, 2.2.1a, b: Conceptual Designs and Engineering Feasibility for Alternatives I, II, III, IV, V & VI	8/18/83
2.1.1&2.2.1 (Alt. IV-A)	Narrative Description Conceptual Design and Engineering Feasibility for Alternative IV-A (oversize rept.: 11 x 17)	7/29/83
2.1.1 & 2.2.1 (Alt. V-A)	Narrative Description Conceptual Design and Engineering Feasibility for Alternative V-A (oversize rept.: 11 x 17)	8/5/83

I-280 TRANSFER CONCEPT PROGRAM - INDEX OF TECHNICAL MEMORANDA & WORKING PAPERS

REPORT NO.	REPORT TITLE	DATE
2.2.2	Transportation Performance Measures	7/1983
2.2.2 (IV-A)	Transportation Performance Measures for Alternative IV-A	8/1983
2.2.2 (V-A)	Transportation Performance Measures for Alternative V-A	8/1983
2.2	Mission Bay Sensitivity Analysis	11/1983
2.2.3	Environment, A. Noise and Vibration B. Hydrology and Water Quality	2/8/83
2.2.3A	Environment, A: Soils, Seismicity and Geology B: Ecology	12/30/82
2.2.3C	Environmental, A. Air Quality, B. Energy	2/14/83
2.2.3 Resp.	Responses to Comments on Working Paper 2.2.3 Environment (includes Ecology; Noise and Vibration; Hydrology and Water Quality; Soils Seismicity and Geology; Energy; and Air Quality	7/11/83
2.2.3 (IV-A)	Memorandum on Alternative IV-A (Comprising Physical Environment, Land Use, Construction and Institutional Considerations)	8/15/83
2.2.3 (V-A)	Memorandum on Alternative V-A (Comprising Physical Environment, Land Use, Construction and Institutional Considerations)	9/1983
2.2.4	Social	4/13/83
2.2.4 Resp.	Responses to Comments - Working Paper 2.2.4 Social	8/4/83
2.2.4A	Social - Land Use	1/28/83
2.2.4A Resp.	Responses to Comments on Working Paper 2.2.4A Land Use	7/11/83
2.2.4 (IV-A)	Social - Evaluation of Alternative IVA	9/15/83
2.2.4 (V-A)	Social - Evaluation of Alternative VA	9/7/83
2.2.5, 6, 7	2.2.5: Historic, Cultural and Recreational Resources of Alternatives; 2.2.6: Urban Design Consideration of Alternatives; 2.2.7: Visual Impacts of Alternatives (oversize rept.: 11 x 17)	2/1983
2.2.5, 6, 7 Response	Response to Comments on Working Papers 2.2.5, 2.2.6, and 2.2.7 Urban Design Report	6/17/83
2.2.5, 6, 7 (Alt. IVA)	2.2.5: Historic, Cultural and Recreational Resources of Alternatives; 2.2.6: Urban Design Consideration of Alternatives, 2.2.7: Visual Impacts of Alternatives - Evaluation of Alternative IVA	8/3/83
2.2.5, 6, 7	2.2.5: Historic, Cultural and Recreational Resources of Alternatives; 2.2.6: Urban Design Consideration of Alternatives, 2.2.7: Visual Impacts of Alternatives - Evaluation of Alternative VA	8/17/83
2.2.8	Public Acceptability	7/8/83
2.2.8(Alt.VA)	Public Acceptability Assessment of Alternative VA	7/29/83
2.2.9	Construction	3/25/83
2.2.9 Resp.	Responses to Comments on Working Paper 2.2.9 Construction	7/11/83
2.2.9(IVA,VA)	Construction for Alternatives IV-A and V-A: Refer to 2.2.3 Memoranda as listed above	

I-280 TRANSFER CONCEPT PROGRAM - INDEX OF TECHNICAL MEMORANDA & WORKING PAPERS

REPORT NO.	REPORT TITLE	DATE
2.2.10a	Capital Improvement Costs for Alternatives I, II and III	1/21/83
2.2.10b	Capital Improvement Costs for Alternatives IV, V and VI	2/18/83
2.2.10c	Annual Operating Costs for Alternatives I, II, III, IV, V and VI	4/5/83
2.2.10a,b,c Response	Responses to Comments on Working Papers 2.2.10a, 2.2.10b and 2.2.10c: Capital Improvement and Annual Operating Costs for Alternatives I, II III, IV, V and VI	8/10/83
2.2.10 (IVA)	Capital Improvement and Annual Operationg Costs for Alternative IV-A	7/29/83
2.2.10 (VA)	Capital Improvement and Annual Operating Costs for Alternative V-A	8/5/83
2.2.11	Economic Analysis of Alternatives I - VI	8/17/83
2.2.11 (IVA & VA)	Economic Analysis of Alternatives IV-A and V-A	10/14/83
2.2.12	Fiscal Impact Analysis of Alternatives I - VI	10/1983
2.2.13	Institutional Considerations	12/30/82
2.2.13 Resp.	Responses to Comments on Working Paper 2.2.13 Institutional	7/11/83
2.2.13 (IVA & VA)	Institutional Considerations for Alternatives IV-A and V-A: Refer to 2.2.3 Memoranda as listed above	
2.2.14	Achievement of Goals and Objectives	11/1983
2.4.1	Draft EIS/EIR Outline	12/7/82
2.4.2, 3	Phase II Final Report	11/1983
PHASE III		
3.1.1	Phase III - AA/EIS/EIR Preliminary Draft	11/22/83
5.1.1	Assist Agencies with Follow-on Activities - Implementation Schedule	2/23/83

I-280 TRANSFER CONCEPT PROGRAM
DRAFT ENVIRONMENTAL REPORT
Publication Date: September 28, 1984

City and County of San Francisco
Department of City Planning
Case Number: 84.385 ENLA

State of California Clearinghouse
Number: 83012509

Prepared under the Direction of a Policy Control Committee Consisting of:
California Department of Transportation
City and County of San Francisco
Metropolitan Transportation Commission

Funded in part by: Urban Mass Transportation Administration
Federal Highway Administration

PUBLIC NOTICE

Notice of Public Hearing and Availability of Draft Environmental Document

REGARDING

THE I-280 TRANSFER CONCEPT PROGRAM

WHAT'S BEING PLANNED?

The California Department of Transportation (Caltrans), Metropolitan Transportation Commission, and the City and County of San Francisco invite you to attend a public hearing regarding the I-280 Transfer Concept Program of substitute projects in San Francisco's Embarcadero area. This Draft Environmental Impact Report (DEIR)/Local Systems Study evaluates six main alternatives and two sub-alternatives consisting of both highway and transit project elements.

WHY THIS AD?

A private consultant has prepared the study for the three sponsoring agencies to describe the potential environmental impacts of each alternative. This notice is to tell you of the availability of the DEIR for your review and to inform you that a public hearing and map display have been scheduled to allow you to comment on the study.

WHAT'S AVAILABLE

The DEIR and supporting working papers are available for review at the Caltrans District Office, 150 Oak Street, San Francisco, on weekdays 8 a.m. to 4 p.m. Come in and take a look, ask questions, express your concerns.

The DEIR is also available for review at the following locations

Metropolitan Transportation Commission
Metro Center
101 Eighth Street
Oakland, CA

San Francisco Main Library
Science and Document Department
Civic Center
San Francisco, CA

San Francisco Municipal Railway Library
949 Presidio Avenue
San Francisco, CA

San Francisco Business Library
530 Kearney Street
San Francisco, CA

WHEN AND WHERE

PUBLIC HEARING:

Date: Thursday, November 15, 1984
Time: 7:30 p.m.
Place: Marina Junior High School
3500 Fillmore Street
San Francisco

MAP DISPLAY:

Caltrans has scheduled a map display to acquaint yourself with the study. Caltrans and consultant staff will be available to answer questions

Date: Wednesday, November 7, 1984
Time: 3 p.m. – 8 p.m.
Place: State Building, Room 1194
350 McAllister Street
San Francisco

CONTACT

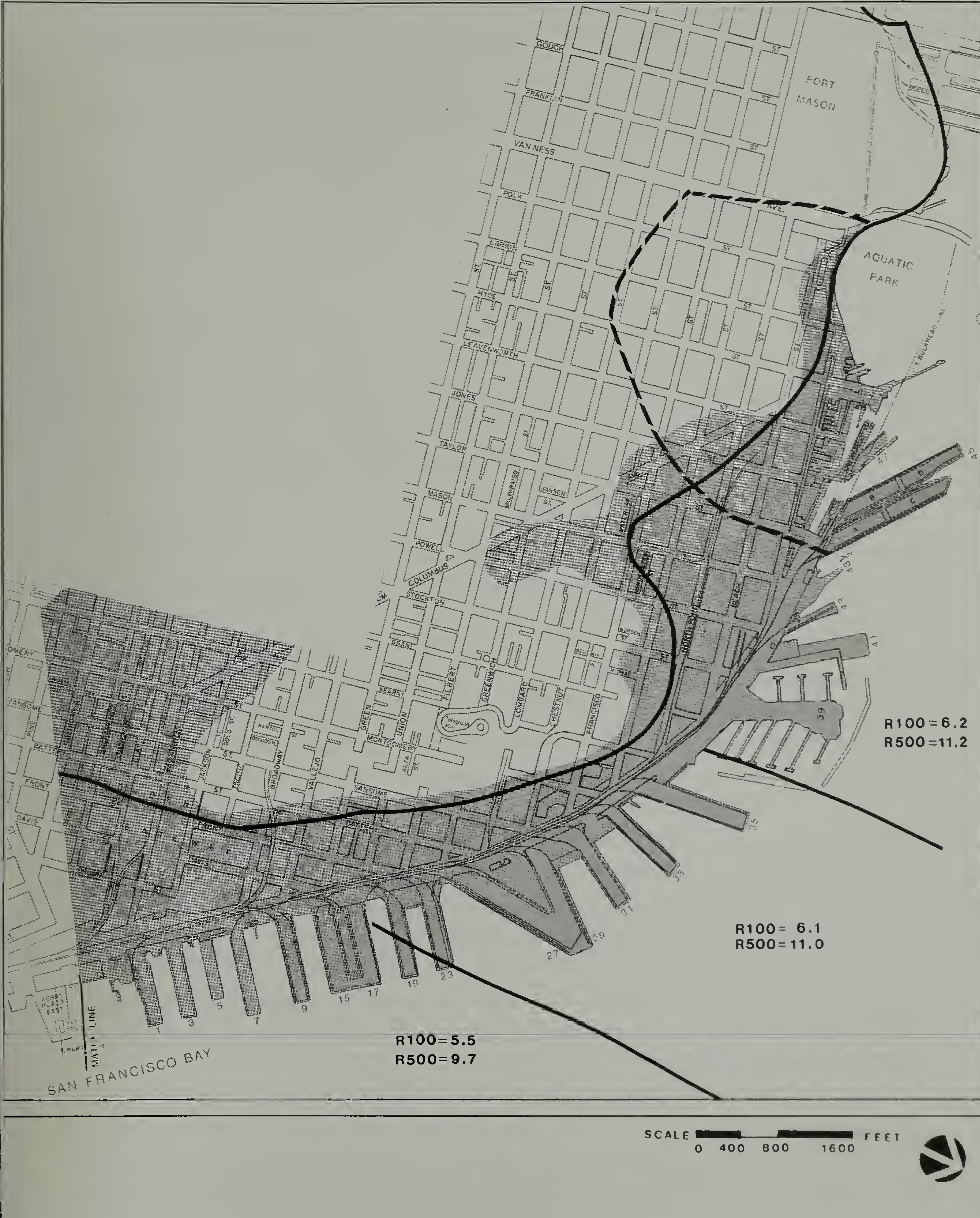
Comments received at the hearing will become a part of the formal hearing record. Written comments received by November 30, 1984 will also be included in the record and addressed in a Summary of Comments and Responses Document

For further information about this study, call Caltrans Information Center at

(415) 557 1840 or write to

Russell D. Sayre
Project Manager
P O Box 7310
San Francisco, CA 94120 7310

Caltrans


FORT MASON
AQUATIC PARK
GOUGH
FRANKLIN
VAN NESS
POLK
LARKIN
HYDE
LEAVENWORTH
JONES
TAYLOR
MASON
POWELL
COLUMBUS
STOCKTON
GRANT
KEARNY
MONTGOMERY
SANSOME
BATTERY
FRONT
DAVIS
FILBERT
GREENWICH
LOMBARD
CHESTNUT
FRANCISCO
BEACH
JACKSON
BROADWAY
VALLEJO
GREEN
UNION
R100=6.2
R500=11.2
R100= 6.1
R500=11.0
R100=5.5
R500=9.7
SAN FRANCISCO BAY
MATCH LINE
SCALE
0 400 800 1600
FEET

IV-25

foot-diameter force main to the Southeast Water Pollution Control Plant. A major expansion of the Southeast plant was completed in October 1982 to accept the increased load from North Point. The collectors along the Embarcadero Corridor have been enlarged to 9-foot and 14-foot (inside width) concrete boxes to reduce the number of outfalls along the north and east waterfronts. The system now handles 33 billions of water annually.

The number of uncontrolled wet weather discharges along the Corridor averages about 100 per year, 40 occurring between Fort Mason and Jackson Street and about 60 in the China Basin area. (After the newly constructed Eastside Collection System begins functioning later in 1983 these discharges will be reduced to an average of 14 per year along the Embarcadero Corridor; four between the Bay Bridge and Black Point, and ten between the Bay Bridge and China Basin.)[49] The impacts of uncontrolled wet weather discharge on the physical water quality (i.e., increased sediment, and variations of temperature, dissolved oxygen, pH, coliform and suspended solids) are generally confined to the upper three feet of water. These changes are temporary during the discharges and return to normal levels three to four days after the spills.

Bottom sediment samples from the China Basin Channel indicate that the discharge points are significant sources of metals, oil and grease and petroleum products. These pollutants appear to be restricted to the upper reach of the Channel and would not be expected along the remainder of the Corridor, due to tidal and current mixing.[50]

Little information is available on groundwater quality. Sewage contamination of the fresh groundwater has occurred in the Fort Mason area.[51] Because the Corridor contains many miles of sewer pipe and collection system, and this system has leaks, it is likely that the brackish to saline water has also been contaminated in some places.

The results of water quality testing from groundwater sample wells in the Mission Bay area indicate that total and fecal coliforms were present in 1979 and that most of the water was brackish to saline.[52]

3. Energy

Gasoline-powered passenger cars and diesel-powered buses are significant consumers of energy which would be affected by the proposed project because of changes in the amount

of travel. In addition, because of the improving economy of new cars, the current fleet average fuel efficiency is expected to increase by 60% by year 2000.

The existing electrical energy-using systems that would be affected by the proposed project include cable cars, street cars, trolleys and light rail vehicles. Energy for the operation of electrically powered San Francisco Municipal Railway vehicles is generated from hydroelectric power by the Hetch Hetchy Water and Power Department and distributed by PG&E.

Energy consumed by San Francisco transit systems in fiscal year 1981/82 is shown in Table IV-19. The energy consumption of particular transit lines appears in the Energy Impacts section (V.D. 3). In addition, a rough estimate of the energy consumption of motor vehicles in San Francisco has been provided.

4. Air Quality

San Francisco's persistent summer winds and its upwind position with respect to major pollutant sources continue to give it relatively clean air compared with other parts of the Bay Area. Nevertheless there are periods, most often in fall and winter, when low winds and temperature inversions cause atmospheric stagnation. At such times pollutant concentrations, especially carbon monoxide (CO) near heavily traveled streets, become elevated in much of the Bay Area. On sunny days in the summer and early fall, portions of the Bay Area experience elevated concentrations of ozone, a pollutant formed in the atmosphere over a period of several hours. Under these conditions pollutants emitted in San Francisco may increase ozone concentrations in downwind areas even while ozone levels in San Francisco itself are not elevated.

The Bay Area Air Quality Management District operates a network of permanently placed monitoring stations in the Bay Area. It also performs special studies of local areas where there is a potential for violations of the CO air quality standard. The permanent monitoring station in San Francisco is located in the southeastern portion of the City at 900 Twenty-third Street. Special studies, called "Hotspot" studies, were performed at Washington and Battery Streets in 1979-80, and at 474 Geary and 100 Harrison Street in 1980-81. Monitoring data from these stations are presented in Tables IV-20 and IV-21. The data indicate that violations of the federal 8-hour average CO standard have occurred in downtown San Francisco between 1979 and 1981. It should be noted that the most

Table IV-19

ENERGY CONSUMPTION OF VEHICLES IN SAN FRANCISCO

(Fiscal Year Ending June 30, 1982)

Travel Mode	Energy Consumption	
Trolley Coach	23,340,000	Kilowatt Hours
Light Rail Vehicles	49,596,000	Kilowatt Hours
Buses	5,463,000	Gallons Diesel
Cable Cars	2,513,500	Kilowatt Hours
Peninsula Commute Service[1]	1,900,000	Gallons Diesel
Motor Vehicles[2]	110,000,000	Gallons Gasoline

[1]Total annual energy for Peninsula Commute Service railroad obtained from Curtis Kamai, Chief, Rail Planning Branch, Caltrans, San Francisco, telephone conversation, February 7, 1983.

[2]This is a rough estimate based upon 5.9 million vehicle miles traveled in 1979 (provided by Hanna Kollo, Senior Planner Analyst, Metropolitan Transportation Commission, Berkeley, California, telephone conversation, February 7, 1983) and an average fuel economy of 17 miles per gallon (California Department of Transportation, Office of Transportation Laboratory, Division of Construction, Energy and Transportation Systems, Sacramento, California, December 1978).

Source: San Francisco Municipal Railway, Section 15 Report for Fiscal Year 1982 to Urban Mass Transportation Administration, San Francisco, California, 1982.

Table IV-20

SAN FRANCISCO AIR POLLUTANT SUMMARY 1979-1982[1]

POLLUTANT	FEDERAL STANDARD[2]	STATE STANDARD[3]	1979	1980	1981	1982
Carbon Monoxide (CO)						
1-hour average (ppm)	35	20				
Highest hourly average			20	10	8	--
No. of exceedances			0	0	0	0
8-hour average (ppm)	9		9			
Highest 8-hour average			13.8	7.5	5.3	9
No. of exceedances			1	0	0	1
Ozone (O_3)						
1-hour average (ppm)	.12[4]	.10				
Highest hourly average			0.08	0.09	0.07	-08
No. of exceedances			0	0	0	0
Nitrogen Dioxide (NO_2)						
1-hour average (ppm)	none	.25				
Highest hourly average			0.16	0.17	0.11	-13
No. of exceedances			4	0	0	0
Sulfur Dioxide (SO_2)						
24-hour average (ppm)	.14	.05				
Highest 24-hour average			0.034	0.018	0.016	-012
No. of exceedances			0	0	0	0
Total Suspended Particulate (TSP)						
24-hour average (ug/m^3)	260	100				
Highest 24-hour average			117	173	103	106
No. of exceedances			1	6	1	3

Table IV-20 (continued)

SAN FRANCISCO AIR POLLUTANT SUMMARY 1979-1982[1]

POLLUTANT	FEDERAL STANDARD[2]	STATE STANDARD[3]	1979	1980	1981	1982
Total Suspended Particulate (cont'd)	75	60				
Annual Geometric Mean			42.0	52.1	56.0	57.0
Annual exceedances			No	No	No	NO
Lead						
3-month average (mg/m^3)	None	1.5				
Highest 3-month average			0.95	0.53	0.35	--
No. of exceedances			0	0	0	--

[1] 1979 data collected at 939 Ellis Street. 1980-81 data collected at 900 23rd Street.

[2] Federal standard is not to be exceeded more than once per year. Annual average standards are not to be exceeded.

[3] State standards are not to be equalled or exceeded. The State 1-hour average CO standard was reduced from 35 ppm to 20 ppm in 1982.

[4] The federal standard is given in terms of Expected Annual Excesses, which is based on a 3-year running average.

[5] The annual Geometric Mean is a single number that applies to an entire year of data. "No" indicates that TSP concentrations did not exceed 60 (ug/m^3).

Note: ppm = parts per million
ug/mg^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter

Source: BAAQMD, Air Pollution in the Bay Area by Station and Contaminant; and California Air Resources Board, California Air Quality Data.

Table IV-21

MAXIMUM CO VALUES RECORDED AT HOTSPOTS DURING 1979/1980 AND 1980/1981

San Francisco Hotspot Monitoring Programs

	Maximum CO Values (ppm)	
1980/1981	1-hr average	8-hr average
474 Geary Boulevard	15	11.5
100 Harrison, 1st floor	13	7.75
100 Harrison, 5th floor	10	5.62
1979/1980		
Battery/Washington	15	11
Federal Standard	35	9

Source: Association of Bay Area Governments, Air Quality Planning Program, Air Quality Tech Memos 33 and 40, Berkeley, California, June 1980 and January 1982.

critical locations for CO concentrations in the Bay Area are Oakland, San Jose, and Vallejo.

A general improving trend in air quality has been occurring in the San Francisco area over the past decade. In the most recent full year of monitoring at the Twenty-third Street site (1982), no violations of any air quality standard occurred in San Francisco (violations were measured at the Geary Street site in January). Although several factors have contributed to this trend, one of the most important is the effect of ongoing regulations at the state and federal levels controlling emissions from motor vehicles. Based upon existing regulations, further improvements are expected. The rate of improvement would change if existing regulations are altered.

Because state and federal standards were not met for the entire Bay Area in 1979, the Bay Area was designated by the U.S. Environmental Protection Agency as a "non-attainment" area for CO, ozone, and total suspended particulates (TSP). The Association of Bay Area Governments (ABAG), Bay Area Air Quality Management District and MTC with the assistance of other government agencies, prepared the 1979 Bay Area Air Quality Plan,[53] that has been updated by the 1982 Bay Area Air Quality Plan.[54] Together these two documents constitute the Air Quality Maintenance Plan (AQMP) for the Bay Area. Although TSP levels have been reduced and are now in compliance with air quality standards, CO and ozone levels continue to exceed air quality standards in some parts at the Bay Area. The 1982 Plan revision addresses ozone and CO problems. The AQMP includes measures to reduce emissions from both stationary sources and motor vehicles to levels which will result in attainment of air quality standards. Originally compliance was set for 1982, however, the date for compliance has now been extended until 1987.

Winds in San Francisco are generally from a westerly direction and are persistent from May to August. During the rainy season (October to April) the strongest winds flow from the south as well as the west and northwest.

5. Noise and Vibration

The study area was defined to include all streets where bus or rail operations are proposed, and all streets that are expected to experience a noticeable (3 decibel)[55] change in noise level. Noise sensitive receptors were located and the existing noise environment was determined by supplementing measurements made over the last six years

with new measurements made for the study. Noise measurement sites are shown on Figure IV-26. Results of the noise measurement survey are shown in Tables 1, 2, 3, 4 and 5 in Appendix D.

In the Noise and Vibration inputs analysis, commercial, retail and office uses are evaluated using criteria of the U.S. Department of Transportation. Residential land uses, schools, and other noncommercial noise-sensitive uses are evaluated against the goals contained in the Environmental Protection Element of the San Francisco Comprehensive Plan.[56] (See V.D.5. Environmental Impacts and Mitigation, Noise and Vibration for further discussion of criteria.)

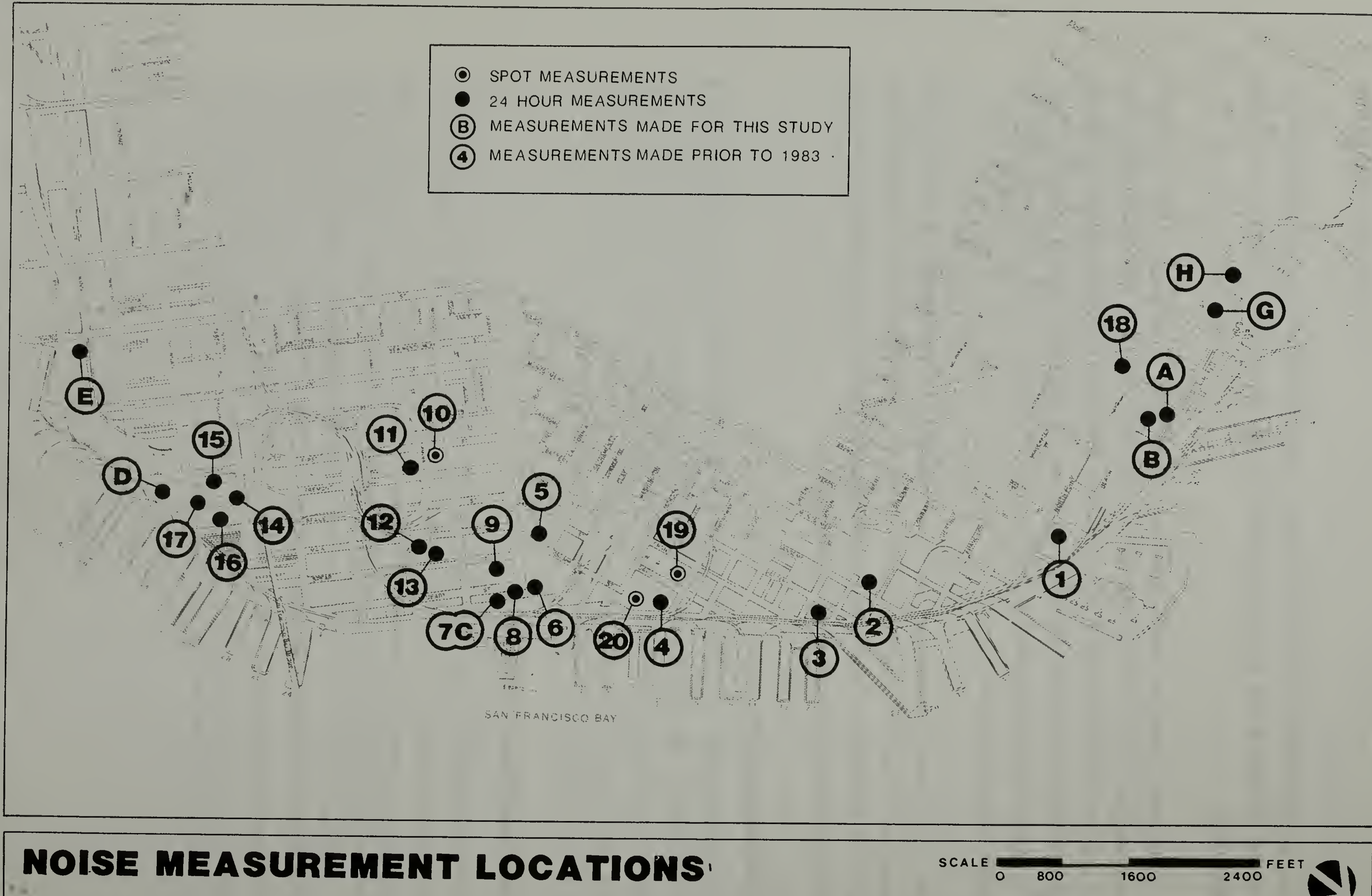
The noise environment in the study area is dominated by transportation noise. Noise levels are fairly constant from 7:00 a.m. to 6:00 p.m. The noisiest hour is typically 8:00-9:00 a.m. or 4:00-5:00 p.m. Following is a description of the land uses, sensitive receptors and noise environments of each study area segment.

a. China Basin Segment

The noise environment in the China Basin segment is dominated by traffic, including trucks and buses on the local streets, trains going to and from the SP Depot, and traffic on I-280. Noise levels are highest along Third and Fourth Streets. During the noisiest hour the Leq would be about 71 dBA 15 feet from the curb.[57] (A discussion of the fundamental concepts of environmental acoustics is included in Appendix D.)

b. South Beach/Rincon Hill Segment

The noise environment in this area is dominated by traffic noise on the Embarcadero roadway and the approach to the Bay Bridge. Housing proposed by the San Francisco Redevelopment Agency for this area would be exposed to an Ldn of 65 to 70 dBA. Land Use Compatibility Guidelines adopted by the City and County of San Francisco would require detailed analysis of the noise reduction requirements and incorporation of noise insulation features in the design before undertaking new construction or development of residential uses in this area. Local regulations are superceded by the State of California Administrative Code Title 25. Title 25 requires that housing include noise insulation that reduces interior noise levels to an Ldn of 45 dBA.



NOISE MEASUREMENT LOCATIONS

IV-26

c. Ferry Building Area Segment

In general, this is the noisiest portion of the study area. The Golden Gateway Commons on the Embarcadero roadway between Washington Street and Broadway are potentially the most affected by this project. The noisiest-hour Leq and Ldn outside of the Golden Gate Commons condominiums is 71 dBA, significantly above the City's goal (an Ldn of 60 dBA) for exterior noise levels in residential developments; however, interior noise levels are an Ldn of about 41 dBA. These levels are consistent with the desirable noise environment for market-rate condominiums in urban areas and are lower than the minimum requirement for new multi-family housing as required by the State of California (an Ldn of 45 dBA).

d. Pier 9 through 35 Segment

Adjacent land uses are primarily commercial and industrial, although several residential areas are located nearby. The major noise source is traffic on The Embarcadero. The noise level outside of the Telegraph Landing Condominiums at Sansome and Lombard Streets is an Ldn of about 65dB. These condominiums are the nearest residences to The Embarcadero in this segment.

e. Fisherman's Wharf Segment

The major change proposed for this segment would be the addition of transit operations on the Embarcadero roadway, Jefferson Steet and Beach Street. Noise levels on these streets are dominated by trucks and buses, which create noise levels ranging from 75 to 85 dBA as they pass.

f. Fort Mason/Aquatic Park Segment

Major noise sources in this area include the sound of surf and distant traffic, helicopter and aircraft overflights and occasionally, musical instruments being played in the park. Noise levels range from an Leq of 56 dBA on calm days to 63 dBA when the surf is heavy.

6. Ecology

The I-280 TCP project area is within the urbanized setting of San Francisco. The project area has limited native wildlife habitat value. The biotic habitat of the area has been largely limited to those wildlife species that have adapted to urban settings such as rock and mourning doves, seagulls and small passerine birds.[58] China Basin is potentially the most important wildlife habitat in the project corridor, although at the present time this habitat is degraded.

In portions of the study area, landscaping with trees and brush species has contributed to bird habitat by providing nesting and feeding areas. The most extensive landscaped areas within the study area are Justin Herman Plaza, Embarcadero Plaza, Levi's Plaza, and Fort Mason/Aquatic Park. These areas have been landscaped and planted with both native and non-native plants and represent valuable open space areas. Of note is a planted Catalina Ironwood tree (Lyonothamnus floribundus) under the Embarcadero Freeway overpass near Fremont and Folsom Streets. In its natural distribution, the Channel Islands, this plant is very rare and is currently under review for listing under the Endangered Species Act of 1973 by the Department of the Interior.[59] However, this plant is a common nursery stock tree and used in landscaping throughout the coastal region of California.

Immediately adjacent to the project area is one of the region's most valuable natural resources, the San Francisco Bay. San Francisco Bay is the largest estuarine ecosystem in California. It remains the most important coastal wetland in the state even though 80% of its historic intertidal marshlands have been dredged, filled and diked.[60] The complex workings of this ecosystem are not yet completely understood. The intertidal and subtidal habitats of the Bay are important as purifiers of the air and water in the region, a resource for renewable products for human consumption and enjoyment, and a support area for some distinctive and unique habitats. Preservation and effective management of existing wetlands and restoration of historic marshlands are recognized as principal goals of both the U.S. Fish & Wildlife Service and the California Department of Fish & Game.

The project area parallels the Bay along its entire length. It is at China Basin, however, that the proposed project actually extends over a tidal influence area of the Bay. The China Basin channel is presently in a degraded condition in terms of aquatic habitat. The waters in the channel generally have a low dissolved oxygen content and a mud bottom high in hydrogen sulfide (H_2S).[61] However, at the mouth of the channel there is a herring fish breeding ground. In 1981 approximately 50,000 herring fish were killed in the China Basin area due to a combination of raw sewage discharge from the sewage outfalls at the west end of the channel and low dissolved oxygen levels in the channel.[62] The degraded aquatic habitat of China Basin is attributed to the poor circulation and flushing action in the channel. The channel has effectively functioned as a primary sewage sedimentation basin after raw sewage overflows from the sewage outfalls at its west end.[63] Recently the sewer system has been upgraded in this area through the San Francisco Clean Water Program, which is now partially operational. The number of overflows has been reduced

to about half of the earlier average of 84 overflows per year. When the system is fully operational, the number of sewer overflows is expected to be reduced further to about 10 times a year.[64] This is expected to improve the quality of China Basin; however, it will be some time before the basin is suitable for spawning habitat. Night herons and at least one pair of snowy egrets nest under the freeway, and in addition, cormorants and grebes feed in the area.[65]

7. Other Issues

The project area consists of gently sloping topography which is fully urbanized. There are no agricultural lands, wetlands, wild and scenic rivers, or floodplains in the study area. Selection of the 'No Project' Alternative (Alternative I) or any other alternative would not affect these natural features. Therefore, discussion of these features has not been incorporated into the technical analysis of this report.

REFERENCES FOR CHAPTER IV

[1] San Francisco Department of City Planning, Memorandum: South of Market Interim Controls, January 26, 1982.

[2] San Francisco Redevelopment Agency, San Francisco Redevelopment Program: Summary of Project Data and Key Elements, January 1981, pages 37-38.

[3] Administrative Amendment to the Final EIR, EE76.441, for the Plan for the Northeastern Waterfront.

[4] Port of San Francisco, 1981 Annual Report and telephone communications with Roger Peters, Traffic Manager, San Francisco Port Commission, March 24, 1983.

[5] San Francisco Bay Conservation and Development Commission, Proposed Special Area Plan for the San Francisco Waterfront, EIR, December 1974.

[6] Roma, Fisherman's Wharf Action Plan, August 1981, page 51.

[7] San Francisco Department of City Planning, Residence-Housing Information Series: Changes in the San Francisco Housing Inventory (1980), page 2.

[8] Census Tracts 104 and 106 each include a small portion of the Chinatown Area.

[9] Data for this section are from Tables IV-4 and IV-5.

[10] Growth Management Alternatives for Downtown San Francisco: Downtown EIR Consultant's Report, vol. 1, ESA, Inc., May 1983, page IV.B.3.

[11] Memorandum from Dean Macris, Director of San Francisco Department of City Planning, "South of Market Interim Controls," January 26, 1982, page 3. Updated: Source - Cumulative Downtown Office/Retail Development in San Francisco as of March 10, 1984.

[12] Coldwell Banker Commercial Real Estate Services, Migration Report of Firms Moving from San Francisco Since 1975, December 7, 1981.

[13] Association of Bay Area Governments, Projections 1983, page 103.

[14] San Francisco Chronicle, October 21, 1982.

[15] San Francisco Municipal Railway, Five-Year Plan, 1982-1987 August 1, 1982, pages 149-159. Updated via communication with Maria Vermiglio, Transit Planner, Muni, August 15, 1984, and Sarah Makusick, Planner, MTC, August 14, 1984.

[16] Parsons Brinkerhoff Quade and Douglas, Inc., et. al., I-280 Transfer Concept Program, Subtask 1.5.6: Travel Demand Forecasting/Analysis, Final Working Paper, prepared for California Department of Transportation, July 8, 1983.

[17] Working Paper 1, Downtown Transportation Improvement Program, for the San Francisco Department of City Planning, May 1982.

[18] City and County of San Francisco, Downtown Plan EIR.

[19] Greg Kipp, Data Analyst, SamTrans, Data Analysis/Grants Department, telephone conversation, October 7, 1982.

[20] Sue Stropes, Muni Planning Division, Methodology for Projecting Future Muni Demand and Vehicle Requirements, June 1982.

[21] Figure IV-4, Off-street Parking, was compiled from the following sources: Inventory of Downtown Off-Street Parking Spaces, San Francisco Department of City Planning, October 1982; South of Market Parking Inventory, San Francisco Department of City Planning, November/December 1981; Embarcadero Office Terraces, FEIR, EE82.129, August 1982. Counts conducted May 13, 1982; Ferry Building Complex, FEIR, EE81.63, October 1982. Counts conducted June 4, 1981, and August 1981; Amendments to the Comprehensive Plan proposed by the Fisherman's Wharf Action Plan, FEIR, EE81.694E, February 1983. Counts conducted September 9, 1981; General Management Plan/Environmental Assessment for Golden Gate National Recreation Area and Point Reyes National Seashore, U.S. Department of Interior, National Park Service, September 1980.

[22] San Francisco Department of City Planning, Amendments to the Comprehensive Plan Proposed by the Fisherman's Wharf Action Plan, FEIR, EE 81-694E, February 1983. Count conducted 31 October 1981.

[23] San Francisco Department of City Planning, Ferry Building Complex, FEIR, EE 81-63, October 1982. Counts conducted June 24, 1981.

[24] Pushkarev and Zupan, Urban Space for Pedestrians, (Cambridge, Mass.: MIT Press, 1975).

[25] State of California, Department of Transportation, San Francisco Peninsula Rail Survey Report, 1981.

[26] City and County of San Francisco, Division of Traffic, Bikeways Plan, Recreation and Commute Elements, adopted June 1982, Maps STR 6204.1 and 6204.2.

[27] The Port of San Francisco, Trucking Guide to the Port of San Francisco, January 1983.

[28] Recent actions have been taken to merge the SP and Santa Fe Railraods.

[29] Gary Green, Traffic Analyst, Port of San Francisco, telephone conversation, March 25, 1983.

[30] Franciscan rocks are typical of the northern California Coast Ranges and underlie the hills of San Francisco. They consist of a mixture of dark-colored muddy sediments, red, green and brown cherts and lava flows of black basalt, all materials laid down on the floor of the Pacific Ocean about 100 million years ago. Cherts are rocks formed by deposits of silica containing microorganisms, which are transformed into hard, waxy or porcelain-like rocks. See Roadside Geology of Northern California, David D. Alt and Donald H. Hyndman, Mountain Press Publishing Company, Missoula, Montana, 1975. Also known as Franciscan Formation or Franciscan Assemblage. Office of Environmental Review, Standard Definitions, San Francisco, California, November 15, 1979 (OER).

[31] J. Schlocker, Geology of San Francisco North Quadrangle, California, U.S. Geological Survey, Prof. Paper 782, U.S. Government Printing Office, Washington, D.C., 1974.

[32] Dames & Moore, "Soils, Seismicity and Geology" in I-280 Transfer Concept Program Draft Technical Working Paper 2.2.3, Parsons Brinckerhoff Quade & Douglas, Inc. San Francisco, California, December 20, 1982.

[33] Bay Muds: Sediments in San Francisco Bay that consist largely of very fine soil particles existing in the presence of much water. They are loosely packed and therefore consolidate or compress easily. Office of Environmental Review, Standard Definitions, San Francisco, California, November 15, 1979 (OER).

[34] Colma Formation: Fine-grained sands with silt and clay at the top, grading into cleaner sand at the bottom. The lower part of the formation is very dense and is slightly cemented in places. Office of Environmental Review, Standard Definitions, San Francisco, California, November 15, 1979 (OER).

[35] California Division of Mines and Geology, Fault Map of California, Data Map Series No. 1, 1975.

[36] Richter scale: a logarithmic scale developed in 1935 by Charles Richter to measure earthquake magnitude by the energy released, as opposed to earthquake intensity as determined by effects on people, structures and earth materials.

[37] T. L. Youd and S. N. Hoose, Historic Ground Failures in Northern California Triggered by Earthquakes, U.S. Geological Survey Professional Paper 993, Washington, D.C. 1978, page 125 and plate 3.

[38] Tsunamis: Long-period waves generated by earthquakes, undersea landslides or volcanoes; upon reaching the shallow water of coastal areas, the waves greatly increase in height and may cause localized flooding. Office of Environmental Review, Standard Definitions, San Francisco, California, November 15, 1979.

[39] Diane Pierzinski, Environmental Planner, Department of Conservation, "Tsunamis," California Geology, Sacramento, CA, March 1981, pages 58 and 59.

[40] URS/John A. Blume, San Francisco Seismic Safety Investigation, June 1974, Page 28 and Figures 5, 6, 7 and 9.

[41] A.W. Garcia, and Houston, Jr., Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, U.S. Army Engineer Waterways Experiment Station, Technical Report H-75-17, 1975.

[42] R.R. Olmsted, Olmstead, N.L. and Pastron, A., San Francisco Waterfront: Report on Historical Cultural Resources, 1977, p. 728.

[43] Dames & Moore, Supplemental Report, Additional Foundation Investigation and Tunnel Design Criteria Proposed Consolidation Sewer, North Shore Outfall Consolidation Project, San Francisco, California, 1979.

[44] For purposes of this report, saline water has a salinity of about 24-35 ppm, fresh water has a salinity of 0, and brackish water has an intermediate salinity.

[45] Dames & Moore, Consultation on Shoring and Dewatering: Proposed One Market Plaza Project, San Francisco, California, 1972.

[46] Dames & Moore, Instrumentation and Consultation Contracts N1 and N2, North Shore Outfall Consolidation Project, 1983.

[47] As points of comparison the State standard for coliform content of drinking water in 2 per 100 ml, for marine shell fish beds 7 per 100 ml and for water contact sport 1000 per 100 ml.

[48] CH_2M Hill, Bayside Overflows, Vol. II, Appendices, 1979.

[49] Harriet Sakuma and Don Hayashi, Clean Water Program, personal communication, 1983. Updated by Steve Laughlin, Clean Water Program, personal communication, August 14, 1984.

[50] CH_2M Hill, Appendix N, Water Quality, Studies for the Proposed Mission Bay Development, San Francisco, 1982.

[51] Dames & Moore, 1983, op. cit.

[52] CH_2M Hill, 1979, op. cit.

[53] ABAG, 1979 Bay Area Air Quality Plan, January 1979.

[54] ABAG, 1982 Bay Area Air Quality Plan, December 1982.

[55] Studies have shown that traffic noise must increase or decrease by at least three decibels before most people will agree that the noise level has changed. Karl D. Kryter, The Effects of Noise on Man, 1970.

[56] These criteria were established at a meeting of a subcommittee of the I-280 study's Technical Advisory Committee, December 1, 1982.

57 The decibel (db) as used in this report is the unit of sound level referenced to the sound pressure corresponding to the threshold of hearing. The A-weighted decibel (dBA) accounts for how the human ear responds to sounds of different frequencies. The equivalent sound level (Leq) is the steady A-weighted level which would generate the same acoustic energy as the time-varying environmental noise. The day-night average sound level (Ldn) is a 24-hour average with 10 dBA added to the levels between 10 p.m. and 7 a.m.

58 Passerine: birds with feet adapted for perching.

59 U.S. Fish and Wildlife Service, Federal Register, Vol. 45 No. 242, December 15, 1980, page 82521.

60 U.S. Fish & Wildlife Service and California Department of Fish & Game, Protection and Restoration of San Francisco Bay Fish and Wildlife Habitat, Vol. 1, August 15, 1979.

61 Theresa Rumjahm, Biologist, Regional Water Quality Board, telephone conversation, December 7, 1982.

62 Bob Tasto, Marine Fisheries Biologist, Menlo Park Regional Office, California Department of Fish & Game, telephone conversation, December 6, 1982.

63 Charles Robinson, Engineer, Regional Water Quality Board, telephone conversation, December 7, 1982.

64 Rhonda Robinson, Environmental Review Coordinator, San Francisco Clean Water Program, telephone conversation, February 18, 1983.

65 Jack Davis, Marina resident, telephone conversation, February 18, 1983.

V. ENVIRONMENTAL IMPACTS AND MITIGATION

INTRODUCTION

This chapter describes the transportation, social, economic and natural environmental impacts associated with each of the eight alternatives described in Chapter III. The first four sections (A-D) of this chapter parallel the organization of Chapter IV, Environmental Setting, and address long-term impacts.

The discussion of long-term impacts includes evaluation of direct and indirect impacts. Direct impacts generally include those impacts associated with a project that have an immediate impact on the environmental setting. One example would be increases or decreases in noise levels as a result of project elements. Indirect, or secondary, impacts are generally not as immediately attributable to project elements. Frequently, indirect impacts are not noticeable until after project completion, and they can affect a larger area than the immediate project corridor. Indirect impacts can be thought of as a second-tier impacts that are caused by direct impacts. For example, improved transportation access (direct impact) might result in increased land values and property tax revenues (indirect impacts).

Growth-inducing impacts of the I-280 TCP alternatives are discussed in Section E.

The short-term construction impacts of the alternatives are discussed in Section F. Because construction impacts are temporary and would not permanently affect the environmental setting, they are discussed more generally than the long-term impacts.

The potential cumulative impacts of the alternatives are discussed in Section G. The potential cumulative impacts associated with the I-280 TCP can be viewed within the framework of existing local, regional, state, and federal plan policies affecting the project area (see Table VII-1), and the attendant cumulative impacts of those plan policies.

The Working Papers prepared in the I-280 Transfer Concept Program study serve as a major resource in the preparation of this chapter of the Draft EIR. These working papers present more detailed technical data than this chapter and the reader is often referred to them for additional information. A list of the working papers appears in Appendix C. These working papers are available for public review at: Caltrans District 04 Headquarters, 150 Oak Street, San Francisco, California; San Francisco Department of City Planning, 450 McAllister Street, San Francisco, California; Municipal Railway Planning Division, Room 204, 949 Presidio Avenue; San Francisco Public Library Science and Documents Room, 200 Larkin Street, San Francisco, California.

Both beneficial and adverse impacts are addressed in this chapter. Where adverse effects are expected, methods of mitigating them are suggested. Except for the Construction section, discussion of mitigation measures is incorporated into the impact analysis. This is because in most cases, the way one element is treated in one alternative acts as a mitigation to impacts from a different treatment in another alternative. Thus, the alternatives themselves act as mitigation measures; selection of one alternative mitigates, in part, the impacts of other alternatives. For example, the Peninsula Commute Service extension is placed in a subway along its entire route in Alternative VA, thus mitigating adverse noise, traffic and land use impacts associated with the at-grade extension in Alternatives V and VI. Where appropriate, additional mitigation measures are suggested in the text.

Probable impacts on historic properties and parklands are addressed in Chapter VI. Chapter VII addresses major issues like conformity of the I-280 TCP with government plans and policies, unavoidable adverse impacts, relationship between short-term environmental uses and enchancement of long-term productivity, and irreversible and irretrievable commitments of resources. A comparison of the trade-offs between all the alternatives is presented in Chapter VIII.

A. SOCIAL AND COMMUNITY ENVIRONMENT IMPACTS AND MITIGATION

This section provides a discussion of the social and community environment impacts of the proposed alternatives. The impacts are grouped into three areas: land use; residential population and affected social groups; and urban design. Mitigation of these impacts largely consists of selecting an alternative which best minimize or eliminates impacts relative to other alternatives. The fold-out chart at the end of this report (Appendix G) graphically portrays the various elements and treatments included in each alternative.

1. Land Use

a. Introduction

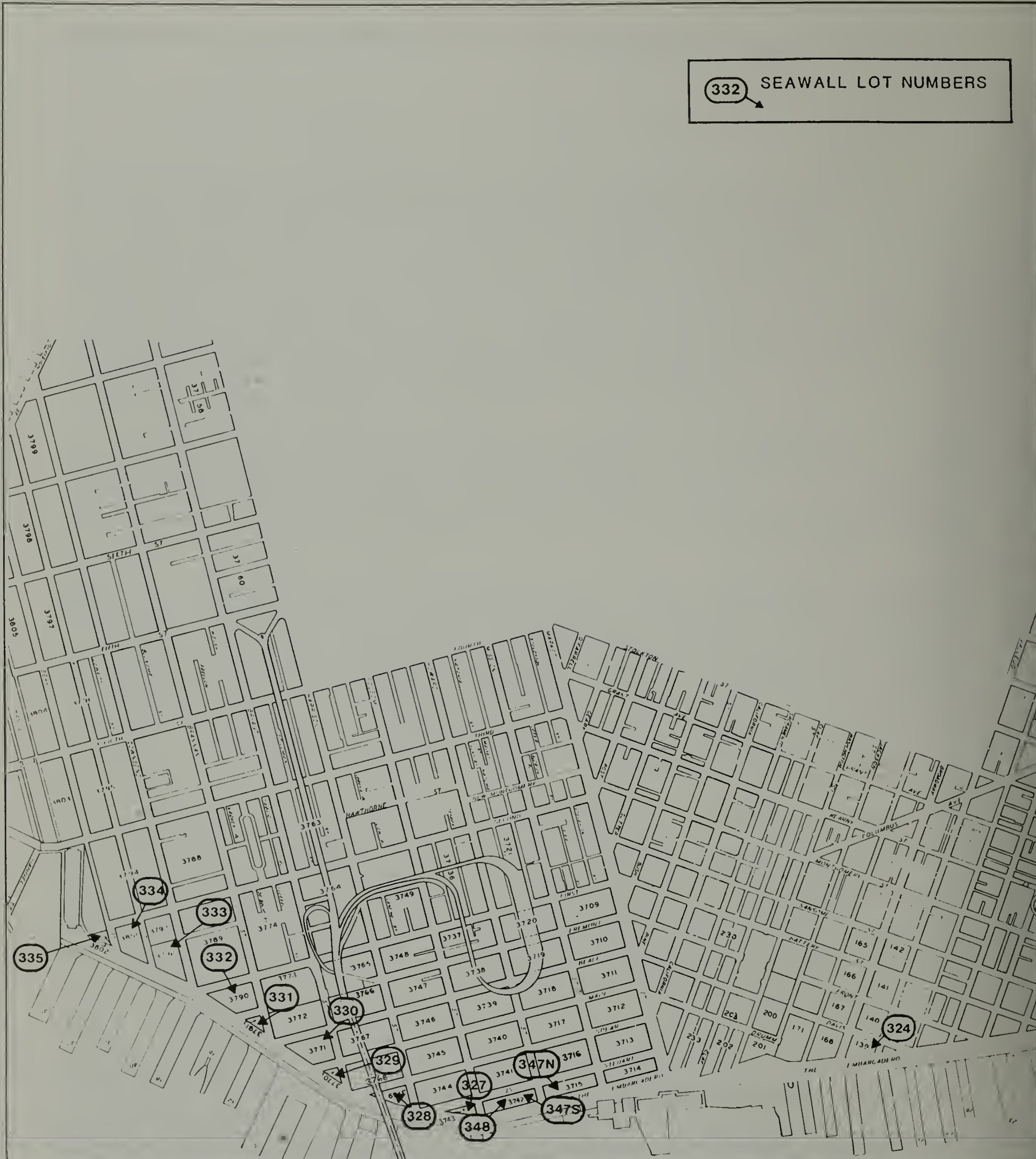
This section describes the land use impacts of Alternatives II-VI. (As the No Project Alternative, Alternative I has no additional impacts and is used as the baseline case in the discussion.) The discussion is organized into two main sections: direct and indirect land use impacts. Direct impacts consist largely of freeing up land currently committed for transportation infrastructure, or of requiring new commitments of land for new transportation projects. The analysis further distinguishes between whether the land freed for or preempted from development lies within Assessor's blocks or within public rights-of-way. Land within Assessor's blocks will be considered potentially developable, while right-of-way land will be assumed to remain in public use. Indirect impacts consist of conflicts or opportunities the proposed projects would present in relation to neighboring land uses, both existing and proposed.

Within the direct impact section, land use impacts are organized geographically, moving from China Basin to Fort Mason/Aquatic Park. Throughout the discussion blocks are identified as Assessor's Blocks (AB) or Seawall Lots (SWL); AB and SWL blocks are marked on Figure V-1.

b. Direct Impacts

Developable land trade-offs are summarized in Table V-1. In general, parcels of less than 3,000 square feet with or without access and parcels of 3,000 to 15,000 square feet without access are considered undevelopable. Many small parcels are areas freed by road realignments such as street closures or bulbs. In the discussion below, unless stated otherwise, estimates of developable land trade-offs do not include lands that are within existing public rights-of-way.

Throughout the waterfront area street closures are proposed at several locations where the South of Market and North of Market grids would meet the realigned Embarcadero roadway. These closures would not make new land available for development, since the rights-of-way would in most cases be required for continued access. These closures actually implement City policies for the waterfront area, as per the Northeastern Waterfront Plan, the Rincon Point-South Beach Redevelopment Plan, and other City plans. The indirect impacts of these closures will be addressed below.



SEAWALL LOT NUMBERS AND ASSESSOR'S BLOCK NUMBERS

SCALE 0 400 800 1600 FEET

SOURCE: CITY AND COUNTY OF SAN FRANCISCO

V-1

Table V-1

DEVELOPABLE LAND TRADE-OFFS BY ALTERNATIVE[1] (Relative to Alternative I)

		China Basin	S. Beach/ Rincon Hill	Ferry Building	Fisher-man's Wharf[2]	Total Developable	Park-land Trade-Offs[3]
	+	---	52	---	15	---	475
Alternative II	-	115	55	103	---	---	43
	net	-115	-3	-103	15	-206	412
	+	100	52	192	15	---	353
Alternative III	-	346	55	103	---	---	43
	net	-246	-30	89	15	-172	310
	+	925	52	178	15	---	316
Alternative IV	-	338	80	103	---	---	43
	net	587	-28	75	15	705	273
	+	925	52	88	15	---	318
Alternative IVA	-	449	80	103	---	---	43
	net	476	-28	-15	15	448	275
	+	---	52	88	15	---	407
Alternative V	-	417	180	103	---	---	43
	net	-417	-128	-15	15	-545	364
	+	---	53	88	15	---	407
Alternative VA	-	417	80	103	---	---	43
	net	-417	-28	-15	15	-445	364
	+	---	52	---	15	---	427
Alternative VI	-	417	180	103	---	---	43
	net	-417	-128	-103	15	-633	384

[1] All figures are in thousands of square feet. One Acre = 43,560 square feet. Figures include land area required to construct the various elements for each alternative. Figures do not include areas that are within existing public rights-of-way.

[2] The Piers 9-35 and Fort Mason/Aquatic Park segments have no developable land trade-offs.

[3] These parkland trade-offs include Justin Herman Plaza, Fort Mason and the proposed Rincon Waterfront Park.

China Basin. Alternatives II, III, V, VA and VI would retain all or part of the existing I-280 stub and add entry and/or exit ramps. The three 4.6-acre blocks bounded by Berry, King, Sixth and Third Streets would continue to be used for the freeway structure, precluding development of that portion of the site in the Mission Bay preliminary proposal.

Alternatives II and III would retain the I-280 stub and add an entry ramp between Third and Fourth Streets. This and the Muni Metro extension right-of-way would require the preemption of approximately 2.7 acres from Assessors' blocks 3796, 3795, 3794, and 3793.

Alternative II would retain the stub over AB 3795 for potential parking, while Alternative III would remove part of the stub, freeing approximately 2.5 acres on AB 3795 for potential development. Alternative III would also require approximately 4.7 acres from AB 3798 and AB 3797 for the E-Line/Muni Metro yard, and an additional 28,000 square feet of the southern edge of AB 3787 for the Fourth Street Metro station. Furthermore, in Alternative III, the option of realigning Berry Street between Second and Third Streets would reduce developable area by 27,000 square feet in the block bounded by King, Second, Berry and Third Streets.

Alternatives V, VA, and VI (which would have more significant land use impacts than Alternatives II and III) would add entry and exit ramps at Second and King Streets. Existing warehousing and light industrial uses on most of AB 3795 and the northern half of AB 3794 would have to be relocated. On the block bounded by King, Second, Third and Berry Streets, Alternatives V, VA and VI would require approximately 3.2 acres for the ramps and for the Muni Metro extension right-of-way. These alternatives would also take almost 5 acres of AB 3796 for a Muni Metro/E- and F-Line yard. About an acre would be required along the southern edge of King Street on AB 3795 for the Muni Metro right-of-way, and the remaining 35,000 square feet would be difficult to develop for uses other than parking because of their difficult configuration and access. Finally, the realignment of Fifth Street and of the Belt Line/Peninsula Commute Service extension shared right-of-way would cut across AB 3797, preempting approximately one acre of that block and presenting difficulties in the development of neighboring parcels because of changes in lot configuration. The extension of Sixth Street would reduce developable area, but would provide vehicular access to the area from Seventh to Fifth Street. Some form of access would be essential to enable this area to develop from rail yards into more intensive use.

Alternatives IV and IVA, which call for pulling I-280 back to Sixth Street and connecting it with the street system at King Street or at Berry and King Streets, would have beneficial land use impacts for the immediate area. Removal of the existing freeway structure between Third and Sixth Streets would create approximately 21.4 acres of new developable land at the present site of the stub. The "freeing" of these blocks would accommodate proposed development in the Mission Bay area. Alternative IV would create two superblocks of new developable land through the closure of Berry Street between Fourth and Sixth Streets (each 9.4 acres), while IVA would retain the existing patterns except for narrowing the blocks bounded by Third, Sixth, King and Berry Streets to allow new ramp lanes. Alternatives IV and IVA would also require the dedication of 100 feet along the southern edge of King Street in each of the four blocks between Sixth and Third Streets for the new roadway, Muni Metro line, and relocated Belt Line; the total land requirement would be approximately 3.6 acres. Both alternatives would require an additional 3.6 acres for a Muni yard bounded by Sixth, Seventh, Berry and King Streets, and 28,000 square feet from the east side of Fourth Street for a bus station. Alternative IVA would also require 18,000 square feet for a bus stop on Townsend Street between Third and Fourth Street, and 65,000 square feet in a path through the block bounded by Second, Third, Berry and King Streets for a new two-lane extension of the Embarcadero roadway.

South Beach/Rincon Hill. Most of the land trade-offs in this area would be exchanges for rights-of-way. The major exceptions are proposals to realign Brannan Street at its intersection with the Embarcadero roadway (for all alternatives except IVA) and Peninsula Commute Service extension alternatives (V, VA, and VI).

The realignment of Brannan Street proposed in Alternatives II, III, IV, V, VA and VI would require approximately 30,000 square feet from SWL 332. This measure would be offset by closing First and Brannan Streets. The overall impacts would be adverse for the South Beach Redevelopment Area, in which SWL 332 is planned as a neighborhood commercial center. The new right-of-way would cut this portion of the South Beach Redevelopment Area in half, and the heavy traffic anticipated for the area would isolate the neighborhood during the day.

All alternatives would require some land for rights-of-way from SWL 334 along the southeast edge of King Street from Second Street to the Embarcadero roadway. The

required area would include 23,000 square feet in Alternatives II and III, 50,000 square feet in Alternatives IV and IVA, and 29,000 square feet in Alternatives V, VA and VI. Alternatives IV-VI would offset part of this land requirement by closing Berry Street north of Second Street, freeing 16,000 square feet between SWL 334 and SWL 335.

The Peninsula Commute Service at-grade extension proposed in Alternatives V and VI would require a 40- to 70-foot strip of land along the waterfront from Second and King Streets to its portal just south of Harrison Street. The extension would preempt about 2.5 acres from five blocks in its path. The rail line would also cut off half of AB 3768, all of SWL 329 and approximately 10,000 square feet of SWL 330 from road access, effectively precluding development and impacting rail and truck access to Piers 30-32 in the event that auto terminal operations commence on those piers. The total land requirement of this treatment between Second and King Streets to the portal would be approximately 150,000 square feet within lot lines.

Alternatives V and VI would adversely impact the South Beach Redevelopment Area by cutting a thoroughfare (the Brannan Street realignment) through its center and developing a 6-foot soundwall and a 190-foot-wide transportation corridor between the majority of the Redevelopment Area and the Bay.

Ferry Building Area. The most extensive changes in the Ferry Building area would be brought about by Alternatives III-VA, which call for removing the Embarcadero Freeway. These alternatives would make land available in five blocks between Folsom and Howard Streets, and in two blocks between Clay and Washington Streets. Alternative III, which calls for removal of the Embarcadero Freeway from Beale to Broadway with no new exit or entry ramps, would free up 4.4 acres of land on eleven blocks.

Compared to Alternative III, Alternative IV would require an additional 14,000 square feet off the southern edge of AB 3740 for a new off-ramp from the remaining freeway structure, while Alternatives IVA, V and VA would require this latter area as well as approximately 90,000 square feet in AB 3739, AB 3740, AB 3741 and SWL 347S for new on- and off-ramps. The new on-ramps would follow the approximate alignment of the existing skyway structure, and would not significantly change development opportunites on those blocks from the base case (Alternative I).

Alternatives III and IV would open significant amounts of land suitable for medium- to high-intensity office or residential uses along the Folsom Street corridor east of the Transbay Terminal. All five alternatives would potentially permit open space expansion and/or development through the removal of the Clay/Washington ramps. Development of or near this open space may require a vote of San Francisco residents pursuant to the provisions of Proposition K, due to possible shading impacts. Properties under these ramps are currently publicly owned and zoned for public uses.

In the Broadway area Alternatives III-VA would remove the Embarcadero Freeway, freeing approximately 12,000 to 15,000 square feet in each of the following blocks: SWL 324, AB 140, AB 141, AB 165. Even these small parcels would be valuable sites in this high-rent area.

The area bounded by the Embarcadero roadway and Steuart and Howard Streets (including Seawall Lots 327, 348 and 347S) would be significantly impacted by all the alternatives. All alternatives would call for the removal of the five structures on SWL 348 to make way for the realignment of the Embarcadero roadway and for the E-Line streetcar. All three lots, with a total of 2.36 acres of lot area, would be absorbed for transportation rights-of-way and for the waterfront Rincon Point Park planned by the San Francisco Redevelopment Agency. The size of this park will be determined by the land requirements of the various alternatives. (See Chapter VI for further discussion of this issue.)

Under all alternatives, the reconstruction of the Embarcadero roadway would not have significant direct land use implications north of Howard Street since the land for the realignment would be taken or given from public right-of-way lands along the waterfront; no development opportunities would be traded over this issue. The most significant direct land exchange would be in the vicinity of Justin Herman Plaza, where from 2.1 acres (Alternative V) to 4.7 acres (Alternative II) of new open space would be made available by straightening out the roadway across from the Ferry Building. The urban design implications of these options are discussed in detail in Section V.A.3.

<u>Piers 9-35</u>. All alternatives would permit the expansion of pedestrian access to the piers and possible extension of the Promenade from Pier 9 to Pier 35, consistent with Port of San Francisco and Bay Conservation and Development Commission policies. The width of the promenade area would vary according to the alignment of the Embarcadero roadway.

Fisherman's Wharf. The only potential shift in developable land would be at Columbus Avenue, which all alternatives propose to close between Beach and Leavenworth Streets; a 15,000-square-foot area might be made developable by the closure. The only other street closure, at the intersection of the Embarcadero roadway with Beach Street, would produce small areas that would not be independently developable because they would abut existing buildings.

The most significant land use changes in the area would be on Beach and Jefferson Streets, which are under consideration for bus or streetcar improvements. Alternative II calls for an exclusive bus lane on Beach and Jefferson Streets, while Alternatives III, IV, V, VA and VI call for a separate streetcar/bus lane on these streets. These alternatives would preempt parking lanes on Beach and Jefferson Streets for the proposed E-Line bus or streetcar operations. Alternative IVA includes a transit mall along Jefferson Street between Powell and Hyde Streets (see Figure III-9g, page III-45) which would dedicate this portion of Jefferson Street to exclusive transit and pedestrian access. Local service access would be retained. The Jefferson Street transit mall is also proposed as an option for Alternative II. In Alternative II the mall would accommodate buses rather than streetcars.

Fort Mason/Aquatic Park. The only exclusive land use change in this area would be for Alternatives III-VI, at the proposed E-Line terminus and turnaround site east of Laguna Street, where approximately one acre of land would be dedicated for the turnaround loop. A more detailed discussion of impacts in this segment is included in Chapter VI, Historical and Archaeological Resources and Parkland, as both Fort Mason and Aquatic Park are on the National Register of Historic Places.

c. Indirect Impacts

The indirect impacts of the various alternatives relate to three main areas affecting land uses: Compatibility (Is the physical and operational treatment compatible with neighboring land uses?); Access (Does the treatment provide the right kind of and sufficient access to serve the existing or planned uses?); and Amenity (Does the treatment add or reduce the amenities that make a site more valuable for a given use?).

Most of the indirect impacts south of Market Street relate to access. The area has historically been a goods assembly and movement corridor, where low intensity uses

require large uninterrupted areas (big blocks) and easy truck access to all points. It is becoming a more pedestrian-oriented area, where medium- to high-intensity office and residential uses require convenient access for frequent movement of people.

I-280 Touch-Down. Alternatives II, III, V, VA and VI would retain all or part of the I-280 stub and add entry and/or exit ramps, contributing to the existing impact of the I-280 stub as a structure isolating China Basin and areas south from the downtown. In some portions of South Beach the improved access could encourage more intensive land use, but maintenance of the stub would have negative impacts on land values for parcels immediately adjoining the stub and its new ramps. Alternatives V, VA and VI would compound this impact with the addition of entry and exit ramps which would extend I-280 as a barrier restricting access between China Basin and the rest of the South of Market area.

Alternatives IV and IVA would have beneficial land use impacts for the immediate area. Removal of the existing freeway structure between Third and Sixth Streets would enhance land values south of the existing freeway by improving visual and pedestrian access between China Basin and the rest of the South of Market area.

Embarcadero Freeway. Alternatives III through VA would increase land values for lands within several blocks of the Embarcadero Freeway throughout the corridor by adding the amenity of visual access to the Bay and reduced noise. The freeway removal option would be more compatible with the recreational/open space uses that are becoming increasingly important throughout the northeastern waterfront.

Embarcadero Surface Road. Alternatives II-VI would improve the compatibility of the roadway with the smaller scale uses which are replacing the break-bulk, assembly and goods movement uses which once dominated the waterfront. All of the proposed reconfigurations of the roadway would create more of a "parkway" on the roadway. The proposed street closures on the inland side of the roadway would improve pedestrian access within the increasingly pedestrian-intensive area of office, residential, and hotel uses inland of the Embarcadero roadway from South Beach to Pier 35. Street closures could also encourage the development of pedestrian-oriented street amenities such as plazas, cafes and retail shops. Proposed roadway configurations and street closures would restrict access to Port of San Francisco facilities, thereby impacting goods movement to and within the Embarcadero roadway area.

Rail Transit Improvements. Rail transit extensions would be critical to support the intensification of uses south of Market Street and provide transit service along the waterfront. South of Market Street, Alternatives III-VI would significantly increase transit access to the office, residential and hotel uses which are replacing industrial and warehousing uses between China Basin and Rincon Hill. Alternatives V, VA and VI, because they would provide the largest increase in rail transit access, could encourage the greatest intensification of uses both in the South of Market area and on the Peninsula. However, Alternatives V and VI would inhibit development immediately adjacent to the at-grade Peninsula Commute Service right-of-way and create a physical and visual barrier between the South Beach and Rincon Point areas and the Bay. Alternatives III, IV and IVA could also encourage intensification south of Market Street (through the Muni Metro extension and E-Line) but to a lesser extent.

North of Market Street, Alternatives III-VI include the E-Line streetcar. These alternatives would provide both improved transit access for land uses between the Ferry Building and Fort Mason. The proposed E-Line streetcar service to Fort Mason would also create an additional transit link between the Marina District and downtown. Alternative II would improve access to a somewhat lesser extent between the Ferry Building and Fisherman's Wharf, since the E-Line would use buses rather than streetcars.

In the Fisherman's Wharf segment, all alternatives except IVA would reduce automobile access while providing better transit access along Jefferson and Beach Streets. This would be compatible with the strong pedestrian character of those streets, and might increase the number of "walk-in" sales outlets at the expense of "destination" outlets. Alternative IVA would intensify this impact on Jefferson Street by creating a pedestrian/transit-exclusive mall. Beach Street retailers might be adversely impacted by increased automobile traffic and by Jefferson Street's competitive advantage due to its pedestrian amenities.

2. Residential Population and Affected Social Groups

This section considers impacts of the alternatives on residential population and affected social groups. The discussion includes impacts on population and demographic characteristics of the project area; housing development; neighborhood cohesion; and the transportation disadvantaged.

a. Residential Population and Demography

The I-280 Transfer Concept Program Alternatives can have a direct or indirect effect on residential population growth and demographic trends within and outside the project area. Direct impacts can occur because of physical changes proposed by the alternatives which would allow development of other proposed projects. An example is the Mission Bay area whose future redevelopment could be influenced by the treatment of the I-280 Freeway (i.e. whether it is taken back to Sixth Street or brought to grade at another location). Another direct influence concerns the effect that access improvements associated with TCP alternatives could have on projects in the Rincon Point/South Beach Redevelopment and Rincon Hill areas. Indirect effects address how access improvements proposed by the alternatives may influence the amount and distribution of growth in the San Francisco Bay Region.

Alternatives I and II would have the least direct effect on residential population growth in the project area. Neither of these alternatives provide for the pullback of I-280 to Sixth Street. As a result, these alternatives would not accommodate preliminary proposals by the project sponsor for development of the Mission Bay area. The Muni Metro extension and E-Line, which would improve access to the Mission Bay, Rincon Hill and Rincon Point/South Beach Redevelopment Areas, are also not a part of either alternative.

Transportation accessibility and the physical improvements provided by Alternative IV and IVA would have the greatest positive direct impact on future population growth in the South of Market area. The Muni Metro extension, the E-Line streetcar service and the removal of I-280 to Sixth Street are included in both alternatives. These improvements would increase the feasibility of developing the Mission Bay, Rincon Hill and Rincon Point/South Beach Redevelopment Areas. The Rincon Point/South Beach Redevelopment Area could accommodate up to 3,000 residential units,[1] and the Rincon Hill area could accommodate up to 7,500 residential units.[2]

Alternatives III, V and VA would provide improved transit access to the Mission Bay and Rincon Point/South Beach Redevelopment Area through the Muni Metro extension. However, neither alternative includes the removal of I-280 to Sixth Street, and would therefore not accommodate preliminary proposals for development of the Mission Bay area. In comparison to Alternative IV, Alternatives III, V and VA would have less direct effect on population growth, but would have more impact than Alternatives I and II.

Alternative VI would improve transit access to the Mission Bay area through the Peninsula Commute Service extension to downtown (also included in Alternatives V and VA). However, this improvement would serve mostly commuters from the Peninsula and would have different impacts than the Muni Metro extension, which is not a part of Alternative VI. Removal of the I-280 Freeway is also not included in this alternative. In addition, as in Alternative V, noise impacts from the rail extension would decrease the feasibility of residential uses in the Rincon Point/South Beach Redevelopment Area (see Section V.A.2.c, Neighborhood Cohesion). As such, Alternative VI would have less influence on population growth than Alternatives III-VA, but slightly greater population effects than Alternatives I and II.

Alternatives III-VI would all improve transit accessibility to the project area, especially in the South of Market vicinity (see discussion of transit service in Section V.C.1). This improved access would be one of many factors influencing commercial office development in San Francisco, which in turn would have an indirect effect on the distribution of residential population growth in the San Francisco Bay Region. While it cannot be determined precisely that residential population growth would result, some locational shifts in the Bay Area population could occur as the demand for housing increases throughout the region.

b. Housing

None of the alternatives would result directly in the removal of residential units. However, a few houseboats, moored on the southside of China Basin immediately east of Sixth Street, could be required to be relocated in Alternatives V-VI. This would be necessary in order to accommodate the new railroad bridge across China Basin at Sixth Street. If relocation is necessary, relocation assistance would be provided as required by the Federal Uniform Relocation Assistance Act of 1977. Those alternatives which significantly improve access to the South of Market area (III-VI) would all increase the potential for residential and commercial office development in that area. As land values rise along with increased office development, pressures for conversion of existing, lower-cost residential uses to medium- and high-density office and residential uses could occur. Improvement of transit access could be one of many factors influencing this conversion process. Areas that contain larger than average shares of lower income households, such as South of Market, would be most likely to be affected. However, it should be noted that existing zoning protects existing residential areas from being converted to different uses.

Alternative IV would have the greatest positive influence on future housing development in the South of Market area. The project sponsor's preliminary proposal for development of the Mission Bay area would be accommodated by removal of I-280 to Sixth Street. Similarly, transit access provided by the Muni Metro extension (Alternatives III-VA) and the E-Line streetcar (Alternatives III, IV, IVA, VI) would benefit the marketability of residential uses in Mission Bay and the Rincon Point/South Beach Redevelopment areas (which proposes up to 3,000 housing units). For Alternatives III-VI, proposed improvements would increase overall transit access to the project area, thereby enhancing the marketability of new housing units which are projected for development in the project area. With these improvements and others, it is likely that the South of Market area would shift from residential uses for lower income, minority and elderly residents and light industrial uses to higher income households and commercial office uses. Improvements in transit access provided by all alternatives except I and II would contribute to some degree to this process of social change.

c. Neighborhood Cohesion

Direct impacts on neighborhood cohesion and the character of existing communities would be minimal for Alternatives I, II and VI, which do not include removal of the Embarcadero Freeway. Removal of the Embarcadero Freeway in Alternatives III-VA would, to some extent, result in a visual integration of activity centers east and west of the Embarcadero. This impact is largely aesthetic, rather than social, and is discussed in more detail in Section V.A.3., Urban Design. From the standpoint of neighborhood character and cohesion, impacts of freeway removal would be negative because of increased congestion on surface streets in the affected area. Of these alternatives (III-VA), Alternatives IVA - VA would have significantly less congestion than Alternatives III and IV because of the new on- and off-ramps, and would therefore have less impact on neighborhood cohesion. The result would be more conflicts among pedestrians, joggers, bicyclists, autos and transit vehicles.

Community cohesion along the waterfront in the southern portion of the project area could be negatively affected by several alternatives. The realignment of Brannan Street proposed in Alternatives II, III, IV, V, VA and VI would require approximately 30,000 square feet from Seawall Lot 332 (see Figure V-1). This area is currently planned as a neighborhood commercial center in the Rincon Point/South Beach Redevelopment Area. As discussed in Section V.A.1.b, the new right-of-way would cut the Redevelopment Area

in half, and isolate the residential neighborhood during the day. The result could be a decrease in daily social interactions, use of common facilities, and residents' cultural, political and social perceptions. The at-grade Peninsula Commute Service extension to the downtown, included in Alternatives V and VI, would also disrupt the community character of the Rincon Point/South Beach Project. As described in greater detail in the Noise and Vibration Section V.D.5.b., noise would increase significantly on the redevelopment site as a result of the at-grade rail extension. Noise levels resulting from 60 train trips per day along the extension are expected to reach an Ldn of 72 dBA at a distance of 50 feet from the tracks. This would be particularly disruptive to the residential portion of the project. Similarly in Alternatives V-VI, the residents of houseboats along the China Basin channel would be adversely affected by the relocated railroad. The new railroad bridge at Sixth Street would result in increased noise levels during train pass-bys. Special mitigation measures to reduce noise impacts to the residential areas would be required (see discussion in Section V.D.5.b.).

As discussed under Section V.A.2.a., the physical nature of transportation improvements included in various alternatives could affect residential population growth in the South of Market area. Increases in this area's residential population as well as general changes in the area's land uses would result in changing demands for community services. The extent of these changes in demand would correlate directly to the extent of growth and redevelopment in the area south of Market Street. Specifically, Alternatives IV and IVA would have the greatest impact, as new community and cultural facilities are developed to serve areas such as Rincon Hill, the Rincon Point/South Beach Redevelopment Area and Mission Bay. Alternatives III, V and VA would have the next greatest influence on demand for community services, followed by Alternative VI, and finally Alternatives I and II.

d. Transportation Disadvantaged

Several portions of the project area have large concentrations of transportation disadvantaged (defined as young, elderly, handicapped, poor people, and others who do not own automobiles). The largest concentrations are located in the South of Market Street area (Census Tracts 176, 178, 179 and 180), the eastern portion of Chinatown (Census Tracts 106, 115 and 117) and the Marina (Census Tract 102). Figure IV-8, in the Environmental Setting Chapter, illustrates the location of these neighborhoods.

Transit-dependent persons living in the South of Market area near the Embarcadero would benefit from service improvements provided by the Muni Metro extension and the E-Line streetcar service in Alternatives III-VI. Transit travel times for trips along the Embarcadero Corridor would be reduced by an average of three to five minutes for these Alternatives in comparison to Alternative I, the No Project Alternative. (See Table E-1 in Appendix E). However, under Alternatives III and IV, transit-dependent persons using surface transit lines downtown would be adversely impacted by projected delays due to congestion resulting from removal of the Embarcadero Freeway. For example, Mission Street lines in the South of Market area would experience delays of up to six minutes. Lines serving the Fisherman's Wharf segment, such as the 42, could experience 16-minute delays in the northbound direction and 11-minute delays in the southbound direction. Line 30, which serves the Marina, Chinatown and South of Market, would experience 3- to 5-minute delays.[3]

Although not as extensively as in Alternatives III and IV, other alternatives would experience similar delays in surface transit travel times as compared to existing conditions. Alternatives I and II would experience the least delays. Mission Street lines would average 1- to 2-minute delays over existing conditions, the 42-Line would experience 4- to 5-minute delays and the 30-Line would experience 0- to 1-minute delays. Alternatives IVA-VI would experience similar delays in transit travel time which, in general, would be 1 to 3 minutes greater than delays experienced in Alternatives I and II. Notable exceptions would include 6- to 7-minute delays on the 15-Line serving Hunters' Point and 9- to 11-minute delays on the 42-Line serving the Fisherman's Wharf segment (see Table E-1 in Appendix E).

Bus-stop spacing along the Embarcadero roadway would be increased for the 32-Embarcadero line in Alternative I and transit stop spacing increased for the E-Line/Muni Metro extension in other alternatives to improve transit operating speeds. Where this line passes through neighborhoods with relatively high percentages of transit-dependent residents (Marina and South of Market), consideration should be given to maintaining existing stop spacing so that transit access for elderly and handicapped groups is not adversely affected.

3. Urban Design

The Urban Design analysis draws on more detailed discussions in other sections of this chapter such as Land Use (Section V.A.1) and Transportation (Section V.C.1), and Chapter VI, Historic and Archaeological Resources and Parkland. The Urban Design section considers information in these other sections in evaluating both the functional and aesthetic links between the City and the waterfront. The Urban Design section discusses the issues of views, access, buildings, districts and open space. The impacts discussion considers these issues within the framework of corridor segments, since in each part of the corridor the functional and aesthetic impacts of each alternative overlap to form urban design issues. Mitigation measures to adverse impacts consist of selecting those program elements which minimize impacts. Discussion of impacts in terms of I-280 study corridor segments enables a clearer comparison of the urban design trade-offs associated with each alternative.

a. China Basin

The treatments of the I-280 Freeway structure and the Peninsula Commute Service extension create the most significant urban design impacts in the China Basin segment.

Retention of the I-280 Freeway structure as proposed in Alternatives I and II would not significantly alter the existing conditions described in the setting section. Partial removal, proposed in Alternative III, would open up new views to and from the waterfront along King Street between Third and Fourth Streets. However, actions that enhance development opportunities or improve connections between areas north and south of the I-280 Freeway would have minimal effects on urban design, since only one block of the freeway would be removed in Alternative III.

Alternatives IV and IVA would create the most significant positive impacts in this area by removing the freeway from Third to Sixth Streets. The proposed removal would improve the visual connection between existing buildings in the area, the downtown and the waterfront as well as clearing three South of Market blocks in China Basin for new development. It would also have indirect urban design impacts in altering the existing character of the area. The replacement of the freeway with other development, however, could change the area's visual landscape and may reduce the benefit of the freeway removal.

The surface street connection proposed in Alternative IV between the I-280 Freeway and the Embarcadero surface roadway would significantly alter the existing street pattern in China Basin. In Alternative IV, Berry Street is to be closed and King Street widened to eight lanes, creating a boulevard between Sixth Street and the waterfront. In Alternative IVA, the new I-280 on- and off-ramps connect with the existing alignments of King and Berry Streets which are reconstructed as two to four lane, one-way streets. The creation of a King-Berry Street couplet to connect the I-280 Freeway touchdown to the waterfront maintains the existing street scale while the boulevard provides the opportunity for a monumental entrance to the City. The blocks made available for development in Alternative IV would be larger than in Alternative IVA, but because they would require additional service streets for access, there are no significant differences in urban design impacts between the two alternatives.

The proposal to construct ramps from the existing stub-end of the freeway, in Alternatives V, VA and VI, would significantly reduce views from buildings on King Street between Second and Third Streets to the waterfront and buildings to the south in China Basin. In addition to the direct impacts on warehouses that would have to be removed, the ramps would slightly reduce the area available for a waterfront park proposed as part of the South Beach Redevelopment Area (see Section V.A.1, Land Use). To mitigate the impact on the proposed park, the feasibility of moving the ramps further north to King Street should be investigated during preliminary design.

The proposed at-grade Peninsula Commute Service extension in Alternatives V and VI would have a negative impact on pedestrian-level views in the China Basin area due to the continuous six-foot-high sound walls that would extend as far north as Bryant Street. The surface rail extension would facilitate movement of commuters through China Basin to destinations downtown but it would detract from China Basin as a potential destination, visually and physically separating it from the rest of the City and precluding other development options for the area. Alternative VA would mitigate the negative urban design impacts of a surface route by locating the rail extension in a subway which would terminate at a downtown terminal. However, in China Basin, placing the rail route below grade in Alternative VA would only mitigate impacts directly north of the corridor. Retention of the I-280 Freeway and construction of new ramps to the stub-end, also proposed in Alternative VA, would detract from overall net benefits in the area of China Basin south of the subway route.

Muni Metro extension and/or E-line to a terminal station in the vicinity of Fourth and Townsend Streets are proposed in Alternatives III-VI. Of these, Alternative IVA provides the most direct pedestrian connection between the Muni station and the SP Depot by placing both stations within the same block. Alternative III would require passengers to cross Fourth Street while Alternative IV would propose a below-grade connection across King Street. The design option for the Muni E-Line turnaround on Fourth Street in Alternative IVA would move the E-Line station across Fourth Street and would include a below-grade pedestrian connection to the SP Depot. The below-grade pedestrian crossing could be negatively perceived as a barrier by transit patrons since stairs, escalators, ramps and/or elevators would be required. Alternatives V, VA and VI assume the Peninsula Commute Service extension would have a station in the China Basin area, although the specific design and location is not yet determined.

b. South Beach/Rincon Hill

Important urban design considerations in this segment of the project corridor would be created by reconstruction of the Embarcadero roadway and the Peninsula Commute Service extension.

All alternatives except Alternative I propose reconstruction of the Embarcadero roadway, which would simplify movement along the waterfront. The closure or realignment of streets which intersect the Embarcadero roadway varies among alternatives, but in all alternatives the proposed intersection changes would improve connections to and movement along the waterfront. The fact that Alternatives II, III and VI propose a four-lane roadway while Alternatives IV through VA propose a five-lane roadway for part of this segment poses negligible urban design impacts, since views would not significantly change and pedestrian crossings at intersections would be improved in these alternatives.

The proposed at-grade Peninsula Commute Service extension in Alternatives V and VI would have visual and aesthetic impacts in the South Beach-Rincon Hill segment as far north as the subway portal. As in the China Basin segment, the six-foot continuous sound wall would obstruct pedestrian-level views to the waterfront from many areas within the proposed Rincon Point-South Beach Historic Warehouse/Industrial District, altering the traditional visual and physical connection of this area with the waterfront. Since the existing alignments of Townsend, First, Brannan, Beale and Main Streets would be closed to the Embarcadero roadway, the sound wall would not be broken where it intersects these

streets, and the existing view corridors would be obstructed. The Bryant Street overpass would block views down both Bryant and Main Streets. Alternative VA would mitigate these impacts by locating the rail extension in a subway.

The Muni extension/E-Line and Belt Line proposed in Alternatives III-VI would be located inland of the Embarcadero roadway. The addition of either streetcars or buses along the Embarcadero roadway would improve opportunities for views along the City's entire waterfront corridor. The possible use of historic vehicles would add to the recreational nature of movement along the waterfront. While streetcars would be perceived somewhat more positively than buses in terms of recreational travel, streetcars would require overhead electrification lines and support poles in a corridor which is presently uncluttered by these facilities. Visual impacts of electrification lines and support poles could be mitigated through the use of landscaping, and where possible, securing lines to existing buildings.

c. **Ferry Building**

The Ferry Building segment contains the most complex urban design impacts. Each alternative includes several integrated elements within a small area. Options for this segment include four different treatments of the Embarcadero Freeway as well as three locations of the Muni E-Line/F-Line interface, three different Embarcadero roadway widths and two different Peninsula Commute Service subway terminal locations. The treatment of each element creates positive and negative urban design impacts and the combinations of impacts create urban design tradeoffs.

Perhaps the single most significant element in this segment from an urban design perspective is the Embarcadero Freeway. The freeway overshadows the character and scale of many buildings and districts along the waterfront, including buildings in the East Row and Ferry Building complex. It also obstructs views, isolating the waterfront from the rest of the City. Under Alternatives II and VI, the Embarcadero Freeway would be retained.

Alternatives III-VA would remove the freeway, improving waterfront orientation for visitors and enhancing the visual relationship between the foot of Market Street area, the Ferry Building and downtown. Freeway removal would create new views to the waterfront and enhance the quality of movement along the waterfront. Embarcadero

Freeway teardown would cause increased traffic flows and intersection congestion along the Embarcadero surface roadway. While increased traffic would tend to increase the barrier effect that the roadway would pose for pedestrians, this impact would be offset by improved intersections, signalization and a narrower overall right-of-way to facilitate pedestrian street crossings. The new Embarcadero Freeway on- and off-ramps proposed in Alternatives IVA, V and VA would have minimal visual impacts compared to the freeway they would replace. However, the ramps would need to be accounted for in the design of a proposed hotel at the corner of Folsom and Steuart Streets, just south of the proposed on-ramp.

As in the South Beach-Rincon Hill segment, Embarcadero roadway reconstruction would enhance both the visual quality and the quality of movement along the waterfront. Alternatives II-VI would realign the Embarcadero roadway along Steuart Street north of Harrison Street. The removal of five structures in one block along the Embarcadero roadway between Folsom and Howard Streets would alter the traditional relationship of buildings along the west side of Steuart to the waterfront, but the buildings that would be removed do not contribute notably to the historic or visual character of the waterfront. This proposed realignment would increase the park area of the existing waterfront promenade south of the Ferry Building (see Section V.A.1, Land Use). Embarcadero roadway reconstruction would also remove existing parking in the median in front of the Ferry Building. This would have urban design impacts by reducing the width of the roadway and contributing to the amount of open space in front of the Ferry Building.

The proposed alignments of Muni streetcar lines through the Ferry Building segment present several aesthetic and urban design trade-offs in Alternatives III-VI. In Alternative III, the "grand union" form of interchange with the proposed F-Line at Howard Street would reduce vehicular access to the block of Steuart Street between Howard and Mission Streets and would alter the setting of buildings in this block by introducing tracks, a station and overhead power supply lines. Locating the grand union at Howard Street would ignore the historic role of Market Street as a transit corridor. Alternatives IV, V, VA and VI would differ from Alternative III in that the E-Line/F-Line interface would occur at the foot of Market Street near Justin Herman Plaza. This location for the E-Line/F-Line interface creates a trade-off in terms of historic precedence versus existing uses. This plaza area was originally designed as a point of interchange between all the City's major transit lines, and, from a historical perspective, locating the streetcar

interface here would focus on the area's transit use and enhance the former significance of the Ferry Building as a transit terminal. However, the existing design and use of Justin Herman Plaza would be altered by this proposal. Impacts on pedestrian safety, the character of the park and proposed mitigation measures are discussed in Chapter VI, Historic and Archaeological Resources and Parkland. Alternative IVA would mitigate potential impacts of Alternatives IV, V, VA and VI by locating the E-Line/F-Line interface just south of the Plaza, at the existing Muni trolley bus turnaround.

Alternative IVA includes design options for the Muni trolley bus turnaround and Embarcadero roadway pedestrian crossings in front of the Ferry Building. Of the three trolley bus turnaround design options, the most desirable urban design solution is the option which concentrates transit activities in the Embarcadero roadway median, providing a logical focus for transit facilities. With regard to design options for the Ferry Building pedestrian crossing, either a pedestrian bridge or a below-grade connection would be negatively perceived as a barrier by pedestrians and would not result in substantial time savings (see Section V.C., Traffic and Transportation). A pedestrian bridge would also detract from the front elevation of the Ferry Building and from views along the Embarcadero roadway corridor.

The Peninsula Commute Service extension proposed in Alternatives V and VI would have little or no direct visible impact since in the Ferry Building segment the route to Rincon Annex would be below-grade and the important architectural features of this structure, such as the lobby and facade, would be preserved. However, indirect impacts with urban design implications could occur. The Downtown Plan restricts building heights to 200 feet in the Rincon Annex area, reflecting San Francisco's policy of restricting building heights along the waterfront and progressively increasing building heights inland. The rail terminal station would be a logical focus of development activity and locating the station in a restrictive height district could produce pressures for development that are inconsistent with the City's urban design policies.

The proposed rail extension in Alternative VA would mitigate many of the corridor and Rincon Annex impacts of the extensions in Alternatives V and VI. The Transbay Terminal location would add to the existing transit activity in an area which can accommodate more intense development with larger scale buildings than at the Rincon Annex. However, this proposal is not without its trade-offs. The demolition of buildings, two of

which are potentially eligible for the National Register, would be required for the new station just south of the Transbay Terminal. A mitigation measure to these impacts would be an alternative route, such as along Second Street to a station adjacent to the Transbay Terminal. This route would allow preservation of the buildings south of the Transbay Terminal. The Second Street corridor would provide a more direct route and minimize construction impacts. Using the existing Second Street right-of-way would also simplify future development opportunities on those parcels which the route proposed in Alternative VA would pass under. If an alternative alignment is selected it would be studied in further detail in subsequent environmental analysis.

d. Piers 9 - 35

Reconstruction of the Embarcadero roadway and the treatment of the E-Line create the most significant urban design impacts in the Piers 9-35 segment. Alternatives II-VI would reconstruct the roadway, modify intersections and provide 35- to 50-foot setbacks from the bulkhead line. As in the South Beach-Rincon Point and Ferry Building segments, both the roadway reconstruction and the E-Line would enhance the scenic corridor and recreational qualities of the waterfront corridor.

e. Fisherman's Wharf

The E-Line bus or streetcar routes proposed in all alternatives would improve recreational access to this area. In Alternative IVA the proposed Jefferson Street Transit Mall (see Figure III-17 in the Alternatives chapter) would enhance the unique identity of Fisherman's Wharf. By closing Jefferson Street to through traffic, pedestrian movement in the area would be greatly facilitated thus having a positive urban design impact. This positive impact would also apply to the option of operating two-way buses along the Jefferson Street Mall in Alternative II.

f. Aquatic Park/Fort Mason

Impacts on Aquatic Park and Fort Mason would be limited to those created by the proposed Muni E-Line. The bus route proposed in Alternative II would improve access to the parks, but would result in the taking of sidewalk and setback areas along the south side of Bay Street. This taking would significantly impact garage access for residents on this side of the street. Alternatives III-VI would all have impacts due to the proposed Muni E-Line streetcar route. While improving transit access to the parks, the proposed E-

Line could raise concerns for pedestrian safety. Specific design treatments have been proposed to address these concerns. The proposed E-Line turnaround in Fort Mason would change the use of park area by 0.82 acres (35,500 square feet) in a manner consistent with the Golden Gate/Point Reyes General Management Plan, prepared by the National Park Service. These impacts are discussed further in Chapter VI, Historic and Archaeological Resources and Parkland.

B. ECONOMIC AND FINANCIAL IMPACTS AND MITIGATION

The I-280 Transfer Concept Program would have a number of impacts on the economy of San Francisco and the region. This section describes the impacts of the eight alternatives. The impacts are grouped into two areas: economic impacts; and financial feasibility. The impacts would occur both directly and indirectly during the construction and operation phases of the project. The alternatives themselves act as mitigation measures, in that the impacts of one alternative can be mitigated by selection of other alternatives. Employment would be created directly and as a result of multiplier effects.[4] Development and business opportunities would be affected both adversely and positively at different locations along the Embarcadero Corridor. The project would have fiscal impacts on the agencies involved in implementing the program and on other jurisdictions as a result of regional employment. The relative impacts of the alternatives during the relevant phases of the Transfer Concept Program are discussed below, along with discussion of mitigation measures.

1. Economic Impacts and Mitigation

a. Property Acquisition

Construction of any of the alternatives would entail purchase of private properties and displacement of businesses to obtain the necessary rights-of-way. Removal of properties from private ownership would entail loss of property taxes to the City and County of San Francisco.

Some of the properties required for rights-of-way are already in City or state ownership and no property taxes are paid on these parcels. In some cases, however, businesses lease space on these properties and pay a possessory interest fee to the City in lieu of property taxes. Table V-2 estimates the 1985 assessed value and property taxes paid on privately held properties which would be purchased for rights-of-way as well as any possessory interest fees which would be lost from displaced businesses. Alternative VA shows the highest tax loss at $103,580 annually and Alternatives V and VI have the next highest loss at $97,590 and $85,900, respectively. The Peninsula Commute Service is primarily responsible for these higher values. Thereafter, the impacts drop sharply to $23,200 for Alternative IV and $19,740 for Alternative IVA. Alternatives II and III reduce property taxes $2,970 and $14,900, respectively.

Table V-2

ANNUAL PROPERTY TAXES AND POSSESSORY INTEREST FEES LOST

	ALTERNATIVE						
	II	III	IV	IVA	V	VA	VI
Assesed Value[1]	$264,170	$1,323,935	$2,422,755	$1,687,578	$8,342,790	$8,852,750	$7,634,330
Property Tax[2]	3,090	15,500	28,300	19,740	97,590	103,580	85,900
City and County	2,630	13,210	24,130	16,840	85,030	88,350	75,030
School District	230	1,130	2,070	1,440	7,280	7,560	6,420
College District	40	200	360	260	1,300	1,350	1,150
BAAQMD	--	15	30	20	90	100	90
BART	190	930	1,700	1,180	5,980	6,220	5,490
San Francisco Redevelopment Agency[3]	0	250	330	130	5,160	250	5,160

[1] The figures reflect current assesed values escalated by 2% annually to 1985 as permitted by Proposition 13.

[2] Based on tax rate of $1.17 per $100 full cash value and also includes possessory interest fees.

[3] Based on 1% tax increment accrued betwwen 1981 and 1985 on properties within the Rincon Point/South Beach redevelopment area. The figures represent a diversion of revenue shown for other agencies above.

Table V-2 also indicates the incidence of tax loss upon the various agencies that currently receive property tax revenues. Some of the properties are located in the Rincon Point/South Beach Redevelopment Area. The assessed value base was frozen in this area as of March 1981, although no tax increment has yet been collected by the Redevelopment Agency. When debts are incurred by the Agency to complete projects in this area, the tax increment accrued as of March 1981 will be collected by the Agency and would not go to agencies currently receiving revenues. If the project is built, the Redevelopment Agency would lose the tax increment opportunity on some properties. The figures in the table represent only the increment accrued from 1981 to 1985, when the rights-of-way are scheduled to be purchased. The figures are not in addition to but are included in the tax amounts shown for the other agencies. Alternatives V and VI clearly have the highest tax loss impacts for the Redevelopment Agency.

Certain other public properties would be released for development under some of the alternatives as a consequence of pulling back the I-280 stub and removing the Embarcadero Freeway. The release of developable land could reduce some of the fiscal impacts of new property acquisition discussed in this section. This could occur if the parcels are sold to private developers but more likely would result from possessory interest fees paid by businesses established on the parcels under lease from public agencies. The potential for such secondary development along the Embarcadero Corridor is discussed in Section IV.A.1, Land Use. The direct fiscal implications cannot be quantified now since specific proposals for secondary projects have not been advanced.

A number of businesses would be displaced by the project alternatives.[5] Alternative VA would have the greatest impact due to the Peninsula Commute Service extension to the Transbay Terminal, displacing 73 businesses and 3 parking lots employing between 500 and 1,700 workers.[5] These businesses are primarily in the office and commercial sectors. Opportunities for joint development of air rights may mitigate this loss, although potential new businesses may not be similar to those displaced. Businesses displaced by other alternatives are mainly in manufacturing, warehousing and distribution. Alternatives II and III would each displace 9 businesses and two parking lots employing 29 persons. Alternative IV affects 12 businesses (plus three parking lots) and 19 employees while Alternative IVA would displace 11 businesses (plus three parking lots) and 11 employees. Alternative V would displace 22 businesses and three parking lots employing 59 persons and Alternative VI would displace 20 businesses (plus two parking lots) with 42 employees. The manufacturing, warehousing and distribution firms may find it difficult to relocate in San Francisco since the kinds of businesses they represent have

been increasingly priced out of space due to encroachment of more intensive land uses. These businesses are located very near the proposed Mission Bay project, which would substantially alter the character of this district and make relocation in the immediate area even less feasible.

b. Construction Phase

Construction of the project would create temporary employment in the building trade industries which would generate short-term revenues to San Francisco and other jurisdictions in the region. The expenditures would also induce secondary employment throughout the region. The employment and revenue impacts of the alternatives are summarized in Table V-3. Alternative I involves minimal construction and its impacts have not been quantified. The alternatives requiring the largest construction expenditures -- V, VA, and VI -- all feature the extension of the Peninsula Commute Service rail line to downtown San Francisco.

The construction employment and associated fiscal impacts of the alternatives are related to the cost of fixed facilities. The proportion of fixed facility costs to total costs varies from about 76% for Alternative VI to 83% for Alternative VA, but this does not change the ranking of the employment and revenue-generating potential of the alternatives. Alternative VA would directly create about 7,100 person-years of employment and generate an additional 11,200 person-years of employment regionally. Over the six-year construction period, as many as 1,000 workers could be employed at one time. Alternative V would create more than 4,600 person-years of construction employment and induce about 7,100 secondary jobs. As shown in the table, the remaining alternatives would generate lesser employment levels, with Alternative II (1,079 direct jobs) showing the lowest employment impact.

If current estimated residency patterns continue, 30% to 40% of the construction workers would live in San Francisco and the remaining employees would live elsewhere in the region. While working in San Francisco, it is estimated that each employee would make nearly $1,300 in taxable expenditures which would yield sales tax revenue to San Francisco. Further, the firms engaged in construction would be required to pay a payroll tax to San Francisco based on the salaries paid to workers on the job. These sales and payroll tax revenues are shown in Table V-3; they would accrue only during the construction phase of the project.

TABLE V-3

CONSTRUCTION ECONOMIC IMPACTS - ALTERNATIVES II-VI

	II	III	IV	IVA	V	VA	VI
Total Capital Cost[1]	$ 81,613,000	179,011,000	217,502,000	218,875,000	361,930,000	524,116,000	317,967,000
Total Rights-of-Way Cost	$ 12,870,000	26,125,000	35,458,000	31,971,000	78,002,000	79,002,000	73,849,000
Total Fixed Facilities	$ 65,143,000	138,586,000	167,744,000	172,604,000	277,828,000	136,014,000	241,813,000
Total Labor Cost[2]	$ 32,571,500	69,293,000	83,872,000	86,302,000	138,914,500	218,007,000	120,909,000
Direct Employment[3]	1,079	2,294	2,777	2,855	4,600	7,219	4,004
San Francisco	324	688	833	855	1,380	2,166	1,201
Region	755	1,606	1,944	2,000	3,220	5,053	2,803
Salaries Generated							
San Francisco	$ 9,771,450	20,787,900	25,161,600	25,890,000	41,674,200	65,403,000	36,272,700
Region	$ 22,800,050	48,505,100	58,710,400	60,411,400	97,239,800	152,604,900	81,636,300
Payroll Tax at 1.5% of Salaries	$ 488,573	1,039,395	1,258,080	1,294,530	2,083,710	3,270,105	1,813,635
Sales Tax on Employee Expenditures[4]	$ 17,358	36,905	44,675	46,000	74,003	116,136	64,414
Construction Secondary[5] Employment	1,672	3,556	4,304	4,425	7,130	11,189	6,206
Total Employment	2,751	5,850	7,081	7,280	11,730	18,408	10,210

[1] The basis of these figures is described in I-280 Transfer Concept Program Working Papers 2.2.10a and 2.2.10b. All figures are 1983 dollars.

[2] Assumes 50% of construction cost is labor.

[3] Based on 1982 average annual construction employee salary of $30,200. 1982 Dodge Guide to Public Works and Heavy Construction Sites, McGraw Hill Publisher. Residential split of 30% in San Francisco and 70% in the region based on Downtown EIR Consultant's Report. Vol. 1, May 1983 p. IV.D.4.

[4] Based on average annual employee expenditures of $1,287. 101 Montgomery Street Office Building FEIR, certified May 7, 1981, page 83, and tax rate of 1.25%. The average annual employee expenditure is based on data from office employees and may be different for construction workers.

[5] Construction employment multiplier of 1.55 based on San Francisco Bay Area Impact - Output Model 1967-1974. Cooperative Extension Service, University of California, Berkeley.

c. Operations Phase

Operation of the I-280 Transfer Concept Program would require expenditures by several public agencies, including the City and County of San Francisco, the San Francisco Municipal Railway and Caltrans.[6] These expenditures would result in new employment and would generate indirect economic activity. These economic effects are summarized in Table V-4.

The highest operating costs would be incurred for Alternatives III and IV, while Alternative I requires the lowest expenditures. Most of the other indicators follow this pattern. Alternatives III and IVA would generate the greatest employment at 93 workers. Alternative I shows the lowest permanent employment at 16 workers. For this analysis, it is assumed that current residency patterns would continue and that 87% of the workers would live in San Francisco and 13% in the region. The sales tax revenues shown in Table V-4 assume that transportation workers would make similar expenditures in San Francisco as other downtown workers. No payroll tax would be paid to San Francisco since these workers would likely be employed directly by governmental agencies. If maintenance work is contracted out to private firms, however, payroll taxes would be generated. Indirect employment effects would occur throughout the region.

2. Financial Feasibility

a. I-280 Transfer Concept Funds: Capital Funding Shortfall

The I-280 Transfer Concept Fund currently holds a maximum of $88.8 million in federal funds. This represents approximately $57 million originally designated for the I-280 project, escalated through June 30, 1980 (minus $1.2 million already spent).[7] Under the terms of the program no further escalation of the fund is expected to occur. However, the Transfer Concept Fund requires a 15% local match, adding $15.67 million from local sources to boost the total anticipated funds to $104.47 million. The federal share of these funds is appropriated annually in increments. The I-280 Transfer Concept Fund appropriation for the 1984 fiscal year is approximately $13 million. It is possible that somewhat less than the $88.8 million may ultimately become available for the program at the discretion of the Secretary of Transportation, although there is currently no indication that this will occur.

Table V-4

OPERATING ECONOMIC IMPACTS - ALTERNATIVES I-VI

	I	II	III	IV	IVA	V	VA	VI
Total Operating Cost (millions)	$ 1.149	4.631	9.093	8.785	8.988	7.932	7.989	6.160
Direct Employment[1]	16	48	93	90	93	84	89	68
San Francisco	14	42	81	78	81	73	77	59
Region	2	6	12	12	12	11	12	9
Salaries Generated[2]								
San Francisco	$377,580	1,119,690	2,154,990	2,096,700	2,170,130	1,945,320	2,052,280	1,537,290
Region	$ 56,420	167,310	322,010	313,300	324,270	290,680	306,735	299,710
Sales Tax On Employee Expenditures[3]	260	770	1,500	1,450	1,500	1,350	1,430	1,090
Indirect Employment[4]	18	55	107	103	107	97	102	78
Total Employment	34	103	200	193	200	181	191	146

[1] Assumes 60% of road maintenance costs are for labor based on telephone conversations with Bill Chastain, Caltrans, and Frank Curran, San Francisco Department of Public Works, July 13, 1983. Muni labor factors provided by Luther Freeman, Transit Planner, Municipal Railway, July 14, 1983.

The residential split is 87% in San Francisco and 13% in the region, Downtown Consultants Report, May, 1983, pp. IV, D.2-9.

[2] Assumes average salary of $24,000 for road maintenance workers and $29,000 for transit workers. Telephone conversation, San Francisco Civil Service Commission, July 15, 1983.

[3] Assumes annual expenditures of $1,287. 101 Montgomery Street Office Building FEIR. Certified May 7, 1981, page 83; and tax rate of 1.25%.

[4] Employment multiplier of 1.15 for TCU sector based on San Francisco Bay Area Input - Output Model 1967 - 1974. Cooperative Extension Service, University of California, Berkeley.

All alternatives would be eligible for funding, but this may not be true of all elements. Preliminary discussion with the Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) indicate that removal of the Embarcadero Freeway and the I-280 viaduct as proposed in Alternatives III, IV, IVA, V, and VA may not be eligible unless it is "demonstrated that the removal was a necessary incidental item related to an eligible highway or transit project."[8] It has not yet been determined whether these elements will be funded with Transfer Concept funds. There is also the possibility according to the FHWA that federal funds used to purchase right-of-way for and to construct the I-280 viaduct may need to be repaid to federal authorities if it is demolished.

Table V-5 presents the annual funding requirements for each alternative and indicates to what extent transfer concept funding is adequate. The cost figures have been escalated 8% per year. Only Alternative II is almost entirely fundable with the Transfer Concept Fund. For Alternative III the fund would be completely expended in fiscal year 1986/1987, and it would be expended a year earlier for the other alternatives. Funds to cover the remaining costs for these alternatives will need to be drawn from a variety of federal, state, and local sources. The following discussion suggests what kinds of funds may be available.

b. Capital Funding Sources

Federal and State Funds for Transit. Federal funds for transit capital expenditures are allocated to the region from primarily two sources: UMTA Section 3 and UMTA Section 9.

UMTA Section 3 is a discretionary capital grant program, allocated on a project-by-project basis, available to state or local agencies. The funds are authorized to finance transit capital improvement projects including: (1) the construction of new fixed guideway systems; (2) the acquisition, construction and improvement of facilities and equipment; (3) projects which enhance the effectiveness of any mass transportation project; and (4) the modification of equipment and fixed facilities (other than stations). The funds finance up to 75% of the total cost of the project. The remaining 25% is generated from local sources. In recent years, some cities have offered to "over match" their local contribution in order to improve their position vis-a-vis other cities competing for the limited amount of discretionary funding available.

Table V-5

I-280 TRANSFER CONCEPT FUND SHORTFALL

(Dollars in Million)

	83/84	84/85	85/86	86/87	87/88	88/89	89/90	Totals
Alternative II								
Capital Expenditures[1]	$ 1.45	$ 3.76	$ 17.08	$ 26.94	$ 32.59	$ 22.71	$ .21	$104.73
Transfer Concept Fund[2,4]	$ 1.45	$ 3.76	$ 17.08	$ 26.94	$ 32.59	$ 22.66	$	$
Balance[3]	$	$	$	$	$ .00	$ .05	$	$ .26
Alternative III								
Capital Expenditures	$ 3.01	$ 7.78	$ 37.16	$ 62.60	$ 64.20	$ 66.20	$ 8.01	$248.95
Transfer Concept Fund[4]	$ 3.01	$ 7.78	$ 37.16	$ 56.53	$ .00	$ .00	$ .00	$104.47
Balance[3]	$ .00	$ .00	$ .00	$ 6.07	$ 64.20	$ 66.20	$ 8.01	$144.48
Alternative IV								
Capital Expenditures	$ 2.76	$ 7.15	$ 48.23	$ 77.10	$ 84.06	$ 67.55	$ 7.62	$294.47
Transfer Concept Fund[4]	$ 2.76	$ 7.15	$ 48.23	$ 46.33	$ .00	$ .00	$ .00	$104.47
Balance[3]	$ .00	$ .00	$ .00	$ 30.77	$ 84.06	$ 67.55	$ 7.62	$190.00
Alternative IVA								
Capital Expenditures	$ 2.78	$ 7.21	$ 48.05	$ 77.54	$ 83.64	$ 66.50	$ 8.09	$293.81
Transfer Concept Fund[4]	$ 2.78	$ 7.21	$ 48.05	$ 46.43	$ .00	$ .00	$ .00	$104.47
Balance[3]	$ .00	$ .00	$ .00	$ 31.11	$ 83.64	$ 66.50	$ 8.09	$189.34
Alternative V								
Capital Expenditures	$ 6.08	$15.77	$111.13	$104.66	$123.20	$137.90	$32.29	$531.03
Transfer Concept Fund[4]	$ 6.08	$15.77	$ 82.62	$ .00	$ .00	$ .00	$ .00	$104.47
Balance[3]	$ .00	$ .00	$ 28.51	$104.66	$123.20	$137.90	$32.29	$426.56
Alternative VA								
Capital Expenditures	$ 7.71	$19.97	$119.73	$124.37	$150.71	$169.76	$41.32	$633.56
Transfer Concept Fund[4]	$ 7.71	$19.97	$ 76.80	$ .00	$ .00	$ .00	$ .00	$104.47
Balance[3]	$ .00	$ .00	$ 42.93	$124.37	$150.71	$169.76	$41.32	$529.09
Alternative VI								
Capital Expenditures	$ 5.35	$13.86	$103.84	$ 81.94	$127.08	$ 94.88	$15.88	$451.29
Transfer Concept Fund[4]	$ 5.35	$13.86	$ 85.28	$ .00	$ .00	$ .00	$ .00	$104.47
Balance	$ .00	$ .00	$ 18.56	$ 81.94	$127.08	$ 94.88	$15.88	$338.34

[1] Capital expenditures inflated 8% per year.

[2] Based on total amount of $104.470 including local 15% match.

[3] Assumes both Embarcadero Freeway removal and pullback of I-280 would be eligible for Transfer Concept funding and no federal payback would be required. In either case, the totals in this table would not be affected since the cost of these elements is well below the balances for the appropriate alternatives.

[4] Assumed available in each year for the purpose of funding analysis, actual funds available may vary with Congressional apportionment for each year.

The Section 3 funds appropriated over the last five years average $1.5 billion nationwide, with the Bay Region receiving approximately three to nine percent of the nationwide amount. It is estimated that the region could capture up to an estimated 10% of Section 3 capital funds or approximately $120 million per year.

UMTA Section 9 is a new grant program that provides block grants for both capital and operating assistance. Funds are apportioned by UMTA to urbanized areas according to population and service factors. Funds will be appropriated annually, not to exceed $2.75 billion nationwide in FY 1983-84, $2.95 billion in FY 1984-85, and $3.05 billion in FY 1985-86.

MTC's five-year Capital Program (which is updated annually) is the basis upon which UMTA Section 9 funds will be programmed. The Capital Program indicates that on average approximately $110 million in Section 9 funds are required annually to implement the region's five-year program.[9] The San Francisco-Oakland urbanized area is expected to receive approximately $100 million annually over the next five years. These funds finance up to 80% of the total cost of the project. The remaining 20% (or more) must be generated from state and local sources.

There are two significant transit fundings programs at the state level: the Guideway Program and the State Transportation Assistance Program. The Guideway Program is composed of two funding sources: the State Highway Account funds and Transportation Planning and Development Act (TP&D) funds.

State Highway Account funds can only be used to fund fixed facilities "from the rails down," whereas the TP&D funds can be used for vehicles and rolling stock in addition to fixed facilities. Both sources of funds can only be spent on fixed guideway projects. Statewide appropriations for FY 1983-84 are approximately $100 million, with $60 million from State Highway Account funds and $40 million from TP&D funds. The Bay Area is expected to receive $68 million of these funds. The currently approved state method of using these funds does not permit new projects to be added to the funding process in the first four years which tends to make the program unresponsive to new capital funding requests.

The State Transportation Assistance Program is a block grant program which is distributed to the regions based on population and transit operator revenues; the Bay region receives approximately 33 percent of these funds. Actual appropriations for this program are vulnerable to state budget negotiations between the Legislature and the Governor. In FY 1982-83 the $90 million authorized for the State Transportation Assistance Program was cut back to $70 million and in FY 1983-84, the $103 million was reduced to $88 million. In both instances, the difference was transferred to the General Fund. Of the $88 million appropriated for FY 1983-84, Bay Area transit operators will receive about $29 million.

In 1975, MTC received authority from the state to raise bridge tolls on all state toll bridges within its jurisdiction to fund transit capital improvements "in the vicinity of the bridges." The increases currently generate $9.4 million annually for transit. In 1981, AB 50 was passed which prohibited MTC from further increasing tolls for transit purposes but did allow for indexing tolls based on an $8 million base in FY 1977-78. This would allow an effective revenue base in FY 1983-84 of $13 million. AB 3877 (Campbell) is currently under consideration by the Legislature; this bill would remove the constraints imposed by AB 50 and allow MTC to raise tolls for capital purposes to further its transportation planning objectives. This legislation has passed the Assembly. If it is passed by the Senate with a 2/3 vote and signed by the Governor it will become law this year.

Federal and State Funds for Highways. The following funding sources for highway capital investments have been examined: Federal Aid Urban (FAU), Federal Aid Primary (FAP), Federal Aid Interstate/Federal Aid Interstate Rehabilitation (FAI/FAIR), Federal 85% Funds, the State Highway Account, and Toll Bridge Funds.

The FAU funds are distributed by the FHWA to urban and urbanized areas through the California Department of Transportation (Caltrans). Within the San Francisco/Oakland Urbanized Area, San Francisco receives its own allotment of FAU funds which it exclusively controls. San Francisco receives about $2.5 million to $3 million of FAU funds annually, of which about $1.5 million per year is spent on highway projects. It should be noted that San Francisco's share of FAU monies has decreased recently because of decreasing urban population, compounded by rapidly increasing urban populations in other areas.

San Francisco Department of Public Works staff indicates that any significant changes in the use of FAU monies are unlikely, and would require a policy decision from the Transportation Planning Group (TPG), which consists of representatives of the Department of City Planning, the Department of Public Works the San Francisco Public Utilities Commission, the Parking Authority, the Municipal Railway (Muni), the Police Department and the Mayor's office.

In the I-280 TCP project area, all of the major surface streets are in the FAU system, including the Embarcadero surface roadway. The federal share on FAU projects is 86% with a 14% match coming from state or local sources. The state may contribute to the match if the project has high state interest and is on a state route. Some projects, such as signalization, can qualify for 100% federal share.

The California Transportation Commission (CTC) has jurisdiction over expenditures on FAP roads and all such expenditures are determined through its State Transportation Improvement Program (STIP) process. Because of previous deficits in funding, San Francisco is due as much as $39.4 million in project funds from the CTC through the STIP process.

For a project to receive FAP funds through the STIP process, the project must be designated as a top priority within the county (San Francisco) and by MTC for implementation of the Regional Transportation Improvement Program (RTIP). To date, I-280 Transfer Concept highway element projects have not surfaced in the RTIP/STIP process. The earliest that they can be considered for RTIP/STIP programming is the 1984-85 cycle beginning in the fall of 1983. Two FAP system roads are among the highway elements being examined as part of the I-280 Transfer Concept Program. State Route 480, the Embarcadero Freeway, is an FAP route and the I-280 Touchdown highway elements are part of an FAP route.

Finally, Toll Bridge funds may be used for ramp improvements into the Transbay Terminal. Projects must be presented by Caltrans to the CTC for incorporation into the STIP.

Other federal and state funds such as FAI/FAIR and funds from the State Highway Account do not appear to be available for the I-280 Transfer Concept Program. The 85%

funds could only assist the project if the Embarcadero roadway is designated a State route and made FAP eligible. Further information on these programs may be obtained from Working Paper 2.2.12.

Local Funds. Local funds would be required both to match federal funds and to fund any project costs for which federal or state funds cannot be secured. If San Francisco issues bonds to fund any part of these amounts, the cost of financing must be considered. The City and County of San Francisco's bond rating by both major bonding rating firms - Moody's Investment Service, Inc. and Standard and Poor's Corporation - is Aa, the same as the State of California's. The Aa rating is defined as high quality bond issuances that have strong capacity to pay the principal and interest to their investors. This high bond rating ensures that the city is not required to pay the additional cost of purchasing bonding insurance to guarantee that its investors will be paid for their investments.

Because of the constant flux in the interest rate market, it is impossible to determine the exact interest rate of a long-term bond for the I-280 project. The interest rate will depend greatly on the overall economic recovery of the nation. Trends in past economic recessions indicate that the interest rate on long-term bonds is 4-4.5%. If the I-280 project required bonding at this time, the interest rate would be 8.5% on a 20-25 year bond issuance.

One source of matching funds may be the allocation to the project of the cost of rights-of-way owned by Caltrans and the City and County of San Francisco. AB 3179 allows proceeds from the sale of Caltrans land within a city or county to be used for designated state highway projects within the city and county. Alternatives II through VI all require the use of Caltrans properties. The value of these properties ranges from $1.9 million in Alternative II to $5.17 million in Alternatives V, VA and VI. Additional properties owned by the City and County of San Francisco must also be utilized (with values ranging from $1.644 million to $3.0 million). Perhaps the value of these parcels could also be allocated to the project, as an "in lieu" match of federal funds.

Other potential options include joint development, commercial and industrial assessments, and private sector financing. Several potential options for funding portions of the I-280 TCP are discussed below.

Joint development is defined as a real estate development that is closely linked to public transportation services and station facilities. Joint development requires close cooperation and sometimes contractual agreement between private entities developing the real estate and public transit authorities and other public agencies. The potential for joint development within the project area is limited, but it could be achieved, and with careful planning the financial benefits could be substantial. Projects in the early planning stages, and in particular those located on sites owned by Caltrans and the City of San Francisco, have a high potential for joint development. These sites include the China Basin area, the Muni Metro and Southern Pacific station area, the proposed Peninsula Commute Service terminal (in the vicinity of the Transbay Terminal) and Caltrans land located next to proposed development in the Mission Bay area.

The leverage approaches that public agencies can use include the following: 1) the sale of the lease of the sites could be conditioned on the agency's participation in joint development; 2) a designated portion of the increased value could be captured or returned to the lead agencies; or 3) the lease cost or a designated percentage generated by escalation clauses in the leases could be used for the project. The joint development approach does not lead to immediate financial benefits, but it can lead to benefits over an extended period as projects designated within the joint development are completed.

San Francisco has adopted a Transit Development Impact Fee ($5 per square foot of new office space) to aid in funding transit in the city. This fee is expected to generate approximately $50 million, which could be used to fund Muni transit projects in the I-280/Embarcadero corridor. Fees collected to date have been placed in an escrow account, however, pending the outcome of litigation contesting the legality of the fee.

New assessment districts could be formed to gain funding for benefits obtained from certain elements of the project. For instance, removal of the I-280 viaduct and the Embarcadero Freeway would benefit the firms in the immediate area. Southern Pacific is dependent upon removal of the I-280 viaduct to achieve full development of its project in the Mission Bay area. Developments below the Embarcadero Freeway, such as the Golden Gateway and Victoria Station, may realize a substantial increase in their property values if the freeway is demolished. With approval of affected property owners, an assessment could be levied to pay for the removal of these structures.

Finally, some of the elements of the I-280 Transfer Concept Program may be successfully shifted to the private sector if adequate benefits can be derived. For instance, if the intercept parking facilities were privately developed and operated, capital costs for highway elements would be reduced by about $40 million in inflated dollars. This element is included in Alternatives III-VI. (Parking structures have been categorized as highway-related in this analysis.)

c. Operating Expenditures

Of particular concern to local government are the operating costs necessary over the life of the project. Very often these funds must be appropriated from general fund revenues and cannot be as easily deferred in times of fiscal stress. Table V-6 indicates what proportion of existing costs incurred by the City and County of San Francisco and Muni are represented by the street maintenance and transit operating deficits for each of the alternatives. As noted, the operating cost of the intercept parking facilities has not been included in the costs. Estimates of potential revenues from these facilities have not been made, but it is possible that at least some of the facility costs can be recouped. Further, as mentioned in the capital funding discussion, it may be possible to secure a private developer for these facilities, in which case the city would not incur any operating costs and would in fact realize additional revenues from parking taxes. The remaining operating costs constitute 2.4% to 5.1% of the existing city street maintenance budget.

Muni recovers a portion of its operating costs from farebox revenues. Additional funds are obtained from state and federal sources and the remaining expenditures are defrayed from the general fund of the City and County budget. The figures presented in Table V-6 represent the deficit anticipated after operating revenues are included but without state, federal or general fund revenues. Alternative I would create surplus operating revenues. Alternative IV shows the greatest deficit at more than $2.2 million, with Alternatives III and IVA slightly less. Deficits in Alternatives V, VI and II are $1.96 million, $1.75 million and $1.69 million, respectively. The Muni operating deficit for any of the alternatives does not exceed 2% of the current Muni operating deficit.

Some of the funding sources described in the capital funding discussion above may also provide assistance for transit operating costs. UMTA Section 9 funds may be used for transit operating assistance. It appears from the earlier discussion, however, that most of these funds are required for the region's capital funding program.

Table V-6

OPERATING COSTS AT PROJECT COMPLETION TO CITY AND COUNTY OF SAN FRANCISCO AND SAN FRANCISCO MUNICIPAL RAILWAY AS PERCENT OF CURRENT COSTS
(Dollars in millions)

Operating Cost Category	Alternative							
	I	II	III	IV-a	IV	V	V-a	VI
City Street Maintenance[1]	\$ 0.136	0.178	0.261	0.270	0.287	0.232	0.263	0.192
Percent of Current Budget[2]	2.4%	3.2	4.7	4.8	5.1	4.2	4.7	3.4
Muni Operating Deficit[4]	\$(0.212)[3]	1.695	2.177	2.095	2.229	1.962	1.962	1.747
Percent of Current Operating Deficit Muni Budget[5]	(0.2%)[3]	1.5	2.0	1.9	2.0	1.8	1.8	1.6

[1] Costs for maintenance and operation of the intercept parking facilities are not included in these figures, since these costs could possibly be offset with parking revenues from the facilities.

[2] Budget for street maintenance for fiscal year ending June 30, 1983 is \$5,566,213.

[3] Alternative I generates positive revenues for Muni.

[4] Data on projected transit patronage is presented in Working Paper 2.2.2. Muni deficit assumes average revenue per passenger of \$0.51. Jim Smith, Analyst, PUC Finance Bureau, telephone conversation, July 28, 1983.

[5] Muni budget less enterprise charges (which are included in the deficit figures) is \$110,071,916.

The State Transportation Assistance (STA) program is also available for operating costs. Bay Area transit operators are anticipated to receive about $29 million STA in funds in FY 1983-84.

C. TRAFFIC AND TRANSPORTATION IMPACTS AND MITIGATION[10]

This section provides a discussion of the traffic and transportation impacts of the proposed alternatives. The impacts are grouped into four areas: transit service, traffic and parking, pedestrian circulation; and goods movement. Mitigation measures to minimize or eliminate adverse impacts are also described. The fold-out chart at the end of this report (Appendix G) graphically portrays which of the various elements and treatments are included in each alternative.

1. Transit Service

a. Alternative I

Alternative 1, the No Project Alternative, does not propose any major changes to the existing transit and highway systems serving the waterfront area. Existing waterfront area transit lines would be retained, including the 32-Embarcadero line between Fisherman's Wharf and the existing SP Depot. Service frequencies on the 32-Line would be retained as at present; however, bus stop spacing along the Embarcadero roadway would be increased to improve transit operating speeds. The project area would also continue to be served by Muni Metro, Peninsula Commute Service, AC Transit, BART, SamTrans and Golden Gate Transit lines.

Table E-1 in Appendix E (note: all tables in the text identified as E-1, E-2, etc. are located in Appendix E at the end of this report) summarizes peak-period transit travel times for eleven representative trips for each alternative. The table indicates that local and regional accessibility to the area would be marginally reduced in Alternative I over current levels, with peak-period commute travel times slowed by generally less than three minutes. Fort Mason would continue to lack a direct transit connection to the rest of the waterfront.

Ridership levels for all alternatives are shown in Table V-7, with a more detailed summary of daily patronage provided in Table E-2. Ridership on the 32-Embarcadero line for Alternative I would almost triple by the year 2000, resulting in severe overloads during peak periods. Ridership would also increase on other Muni bus and cable car lines in the study corridor, particularly those serving the Peninsula Commute Service. This would necessitate Muni service increases or substitution of higher seating capacity (e.g., articulated) buses for standard-sized coaches in the future. Muni is currently planning for

Table V-7

PROJECTED DAILY TRANSIT PATRONAGE

Year 2000 – Baseline Projection[1]

	Year 2000 Daily Trips								
	Existing	I	II	III	IV	IVA	V	VA	VI
32 or E-Line[2]	2,600	7,400	11,400	10,300	10,700	10,900	10,000	10,000	14,700
Muni Metro Extension	--	--	--	21,700	21,700	21,700	15,500	15,500	--
PCS or PCS Extension	13,200	19,100	19,200	23,000	23,000	23,000	28,800	29,700	28,100
Total Linked Transit Trips[3] (E, MMX, PCS)	15,000	24,600	28,600	45,100	45,500	45,700	51,100	52,000	42,200

[1] Ridership projections depend highly on downtown growth projections and other factors (described in Working Paper 1.5.6). Lower- and upper-bounds for Alternative IV linked trips, for example, are 70-150% of the baseline. Numbers shown should therefore be used for comparison only.

[2] Includes F-Line users along the Embarcadero roadway.

[3] Equals total trips on E-Line, Muni Metro Extension and PCS, less E-Line and Muni Metro Extension transfer trips to PCS.

Source: DKS, Working Paper 2.2.2 (Alternative V-A), August 1983, pg. 5-7.

long-range system expansion to accommodate increases in ridership. It is assumed that additional service on affected routes would be deployed to meet ridership increases. Peninsula Commute Service ridership is projected to increase by almost one-half; the line's 1987 programmed capacity would be reached throughout a two-hour peak period. A comparison of transit capacities and load factors is presented in Table E-3.

No rerouting of Muni bus service would be necessary, but some lines could be slowed up to five minutes by traffic congestion. Bus travel would be particularly impacted in the Fisherman's Wharf area during tourist season, and in the SP Depot area. A comparison of transit vehicle delays for the alternatives due to traffic congestion is presented in Table E-4.

Muni Metro operations, presently constrained by insufficient turnback capabilities at the Embarcadero Station, would not be improved in this alternative; capacity would not meet projected year 2000 demand.

Several TSM-type improvements which would benefit transit operations in the study corridor are proposed in all alternatives, including Alternative I. Surface transit operations on First Street approaching the Transbay Terminal would be improved due to the planned transit-only lane along First Street. Seven Muni lines presently use this route, including four that terminate at the Transbay Terminal. Golden Gate Transit bus operations would be enhanced by traffic signal coordination at three intersections along Van Ness Avenue.

b. Alternative II

Alternative II represents the next step in the investment scale beyond the No Project Alternative. In this alternative, the E-Line (using vintage buses) would replace the 32-Embarcadero bus line; a new I-280 entrance ramp would be constructed; the Embarcadero roadway would be reconstructed; a Muni Metro turnback would be added; and intercept parking would be provided. This alternative also provides the option of operating the E-Line buses on a transit/pedestrian mall on Jefferson Street.

Transit accessibility would be slightly improved over Alternative I. The E-Line would provide a direct bus connection between Fort Mason and the rest of the waterfront. Transit running times and wait times would be reduced for travel along the waterfront, with 3 to 4 minute savings (see Table E-1).

The E-Line in Alternative II would attract 11,400 daily riders, 50% more than the 32-Embarcadero line under Alternative I (see Table E-2). Most of this increased patronage would be recreational riders attracted to vintage buses. Peak period overloads are projected north of Market Street, necessitating an increase in the proposed service. Ridership on other Muni lines would be similar to that in Alternative I except for some cable car riders being attracted to the E-Line. SP ridership would be about the same as for Alternative I.

Compared to Alternative I, this alternative would improve bus running speeds in the Fisherman's Wharf and South of Market areas, with savings in round trip times up to 5 minutes. However, net increases in Muni running times are projected over existing conditions. In this alternative the northbound Line 15 would be rerouted with increased trip time to continue service to the SP Depot. As a design option, Muni has recommended provision of an exclusive contra-flow bus lane on Fourth Street between Third and Townsend Streets.

The Jefferson Street transit mall option in this alternative would further enhance Muni service. Two-way operation along Jefferson Street would shorten walking distance from Fisherman's Wharf to the E-Line and Lines 19 and 39, and would make the E-Line more visible and distinctive, particularly for occasional users such as tourists and visitors of the area. Relative to existing operations, running speeds would be significantly improved and existing delays to transit service, particularly a problem on weekends during periods of peak tourist activity, would be reduced or eliminated.

Alternative II would moderately improve existing Muni Metro operational efficiency and capacity by virtue of a new stub turnback at the Embarcadero Station. Capacity would be increased by one-third over Alternative I and the existing condition (see Table E-5).

c. Alternative III

This alternative has several major transit and highway elements not included in Alternatives I or II: the E-Line (rail), Muni Metro extension and Embarcadero Freeway removal. It is intended to reflect the City of San Francisco's 1980 policies concerning transportation improvements in the I-280/Embarcadero Corridor.

Alternative III would improve local and regional transit access to the study corridor. Intra-area, external and through trip times would be significantly improved by faster running times, shorter wait times and, in some cases, better transit connections. For many trips within the study corridor, travel times would improve by up to seven minutes over Alternative I, and two to seven minutes over Alternative II (see Table E-1). The proposed transit-only lane from the Bay Bridge to the Transbay Terminal approach would expedite AC Transit bus access to the terminal and reduce the effect of the Embarcadero Freeway removal. In the absence of this transit lane, delays of two to five minutes would be experienced by AC Transit buses during peak periods.

The E-Line and Muni Metro extension together would attract almost three times as many riders as the E-Line bus in Alternative II, and over four times the 32-Line ridership in Alternative I (see Table E-2). Recreational trips along the waterfront, potential Mission Bay access and SP Depot access are key ridership markets. Peak-period overloads are projected on the E-Line, and are slightly greater than for Alternative I but less than in Alternative II (see Table E-3). Peninsula Commute Service ridership would be increased by 20% over ridership under Alternative I, due to improved transit feeder service. The projected peak-period overloads would require increases in the proposed E-Line service level and in the currently programmed Peninsula Commute Service capacity.

Alternative III would attract a large number of riders from Muni bus and cable car lines (see Table V-8), and would entirely replace 32-Embarcadero and 80X-Gateway bus services. The ridership shifts from bus and cable car lines to E-Line and Muni Metro would help reduce existing overcrowded conditions and reduce the amount of future bus service required and help to counteract bus delays.

Alternative III would adversely impact a large number of downtown bus routes due to increased traffic congestion on City streets, with sizable delays (up to 12 minutes more than in Alternatives I and II) on some lines in the South of Market area in particular (see Table E-4). This may necessitate rerouting of the affected lines.

Localized Muni bus rerouting would be required in the SP Depot area (northbound Line 15) and in the Fisherman's Wharf area (Lines 19 and 39).

Table V-8

RIDERSHIP SHIFTS FROM EXISTING MUNI BUS/CABLE CAR FACILITIES TO NEW I-280 TCP TRANSIT FACILITIES

Year 2000 Daily Passengers Relative to Alternative 1

	Alternative						
	I	II[1]	III	IV	IVA	V+VA	VI
Bus passengers shifting to I-280 TCP transit facilities	--	7,700	19,300	19,300	19,300	22,600	13,800
Cable car passengers shifting to I-280 TCP transit facilities	--	3,000	5,700	6,100	6,200	6,100	6,100
Total Shift	--	10,700	25,000	25,400	25,500	28,700	19,900

[1] Passengers diverted to E-Line bus from other bus lines and from cable cars.

Source: DKS, Working Paper 2.2.2 (Alternative VA), August 1983, page V-20.

Capacity of the Muni Metro subway would be significantly impacted in this alternative (see Table E-5). The turnback would result in reduced capacity due to operational interference with train movement on the Muni Metro extension. This would have an adverse impact on the Muni Metro subway service as it is already operating at capacity during peak periods. However, the turnback could be expanded to a full loop turnaround by Muni in the future. Some flexibility in scheduling Muni Metro and the E-Line/F-Line services would be lost by sharing tracks and by the E-Line/F-Line/Muni Metro extension grand union. However, at the planned service headways this would not adversely affect Muni operating efficiency. The sharing of E-Line track by the Belt Line railroad would not adversely affect E-Line operation; however, it would require a reduction in Belt Line vertical clearance which could adversely affect Belt Line operational flexibility. A variance in Belt Line vertical clearance requirements requires approval by the San Francisco Port Commission and the California Public Utilities Commission.

The Muni Metro/E-Line/F-Line yard facility in this alternative is required for E-Line/F-Line operations and would substantially improve Muni Metro operating efficiency.

d. Alternative IV

As in Alternative III, Alternative IV includes the E-Line (rail), Muni Metro extension and removal of the Embarcadero Freeway. This alternative also includes pullback of the I-280 touch-down ramps to Sixth Street, construction of a new exit ramp from the remaining portion of the Embarcadero Freeway and a Muni Metro subway turnaround loop.

Transit impacts would be essentially identical to those of Alternative III with the following exceptions:

- Muni Metro subway capacity would be substantially increased and passenger delays reduced by a loop turnaround at the foot of Market Street. Muni Metro quality of service and operational flexibility would be improved over Alternatives I, II and III. Alternatives IV and IVA would be the only alternatives in which Muni Metro would have the capacity to fully meet projected year 2000 demand (see Table E-5).

- A more direct F-Line routing would shorten travel times from the Northern Waterfront to Market Street, including Muni Metro and BART transfers. The F-Line would not connect to the Transbay Terminal; however, a slight net increase in transit trips on the E-Line/F-Line is projected.

- Bus running speeds along lower Mission Street would be slightly improved by reduced cross-street congestion attributable to the I-280 pullback. Eastbound operating speeds on Muni and Golden Gate Transit bus lines would be increased by rerouting from North Point to Bay Street.

- Rail transit operations in the China Basin area would be subject to increased auto conflicts, and hence more delays compared to Alternative III.

e. Alternative IVA

Alternative IVA would include the E-Line (rail), Muni Metro extension (with subway turnaround loop) and removal of the Embarcadero Freeway, similar to Alternative IV. This alternative also includes new replacement on-and off-ramps to the Embarcadero Freeway and a pullback of the I-280 Freeway to Sixth Street connecting to a one-way couplet on Berry and King Streets.

Transit impacts are essentially identical to those of Alternative IV except that:

- Evening peak surface street congestion affecting Muni bus routes would be reduced due to the new replacement on-ramp (see Table E-4).

- Ridership potential is slightly higher compared to Alternative IV, primarily due to tourist and recreational trips attracted to the E-Line in the transit mall along Fisherman's Wharf (see Table E-2).

- An optional siding for the single track through Aquatic Park would increase E-Line capacity and operational flexibility.

- The E-Line/Muni Metro extension interface would be south of Howard Street reducing potential conflicts with traffic.

- Muni trolley bus stop and turnaround design options would bring service closer to the Ferry Building, but would involve compromises in terms of route-mileage, trip times and conflict with autos and E-Line. All three options would require additional curb lane or median space in the Ferry Building area for bus layover. As a mitigation measure Muni has suggested the use of an off-street site adjacent to the Justin Herman Plaza within the existing Embarcadero roadway right-of-way for bus turnaround and layover. While operationally advantageous by locating bus activities off-street, bus access to and from the site would create additional conflicts with Embarcadero roadway traffic and pedestrian movements.

- Rerouting northbound Muni 15-Line would not be necessary due to a northbound lane on Fourth Street.

- Muni transit operations would be enhanced by conversion of Jefferson Street to a transit mall reducing conflicts with autos, shortening route length and minimizing turns in route alignment.

- An optional turnback track and station on Fourth Street opposite the SP Depot would shorten E-Line turnaround time and increase operational flexibility. It would, however, increase conflicts with autos and add delays to Fourth Street traffic.

f. Alternative V

The major new component of this alternative is the Peninsula Commute Service extension to downtown (Rincon Annex). The Muni Metro extension and E-Line (rail) are also included but the latter would terminate at Market Street. This alternative also includes Embarcadero Freeway removal with replacement entry and exit ramps and new I-280 ramps near Second and King Streets.

As with Alternatives III, IV and IVA, this alternative provides good transit accessibility to the waterfront from other parts of the City and the region as a whole. In particular, the

relocated Peninsula Commute Service Depot, while retaining an intermediate stop near the existing depot, would improve Peninsula access to downtown; travel time savings would be 4 to 10 minutes in comparison to Alternatives III, IV and IVA, and 10 to 12 minutes in comparison to Alternatives I and II (see Table E-1). Intra-area travel along the waterfront would require a transfer at Market Street, unlike previous alternatives; however, only a few trips would be affected.

Projected overall ridership on the three study transit lines (E-Line, Muni Metro extension, Peninsula Commute Service) is more than twice the comparable total for Alternative I, and also exceeds that of all other alternatives except for Alternative VA. The Peninsula Commute Service extension would increase ridership by 25% over Alternatives III, IV and IVA, with most access by walking rather than by transit. This would reduce Muni Metro extension ridership. Other Muni Metro extension and E-Line ridership markets would be largely the same as for Alternatives III, IV and IVA. Alternatives V and VA would divert the most riders from other Muni bus lines, reducing the need for service increases on them. Peak-period passenger load factors on the E-Line and Muni Metro extension would be less than in Alternatives III, IV and IVA. Projected year 2000 Peninsula Commute Service ridership would be 143% of programmed capacity for 1986-1987 (see Table E-3). Caltran intends to provide adequate capacity through equipment acquisition and schedule adjustment for any increase in demand.

Alternative V would generally reduce surface transit delays relative to Alternatives III, IV and IVA because in this alternative E-Line service would not extend to south of Market Street. However, speeds would still be slower than at present (see Table E-4). In the China Basin area, the railroad grade crossings would delay buses and the 15-Line would be rerouted as in most previous alternatives. Other surface transit routing and operational impacts and Muni Metro system impacts would be as described for Alternative III. This includes the adverse impact on Muni Metro subway capacity resulting from operational interference caused by the combination of the Muni Metro extension and the turnback.

g. Alternative VA

Alternative VA is a modification of Alternative V to include results of investigations of design options and variations requested by Caltrans and the City of San Francisco. The major differences between Alternative VA and Alternative V are the undergrounding of the Peninsula Commute Service extension to a subway station adjacent to the Transbay Terminal and the closure of Mission Street at the Embarcadero roadway.

As with Alternatives III, IV and IVA, this alternative affords good transit accessibility to the waterfront area from other parts of the City and the region as a whole. In particular, the relocated Peninsula Commute Service depot, while retaining an intermediate stop in the China Basin area, would greatly improve Peninsula access to downtown; travel time savings would be 2 to 3 minutes in comparison with Alternative V, 7 to 12 minutes in comparison to Alternatives III, IV, and IVA, and 12 to 15 minutes in comparison to Alternatives I and II. Intra-area travel along the waterfront would require a transfer at Market Street, as in Alternative V; however, only a small number of trips would be impacted. PM peak period transit travel times on Muni surface routes would be similar to Alternative V (see Table E-1) with several lines experiencing 1- to 2-minute time savings in Alternative VA (see Table E-4).

Projected overall ridership on the three study transit lines (E-Line, Muni Metro extension, Peninsula Commute Service) is more than twice the comparable total for Alternative I, and also exceeds that of all other alternatives. Alternative VA would increase Peninsula Commute Service ridership by 29% over that of Alternatives III, IV and IVA and 3% over Alternative V (see Table E-2). As in Alternative V most access would be by walking rather than by transit. This would reduce Muni Metro extension ridership. Other Muni Metro extension and E-Line ridership markets would be basically the same as for Alternatives III, IV and V. As with Alternative V, Alternative VA would divert the most riders from other Muni bus lines, reducing the need for service increases on them. Peak-period passenger load factors on the E-Line and Muni Metro extension would be less than in Alternatives III, IV and IVA. Projected year 2000 Peninsula Commute Service ridership would exceed programmed capacity for 1986-1987 (see Table E-3). Caltrans intends to provide adequate capacity through equipment acquisition and schedule adjustment for any increases in demand.

Alternative VA would generally reduce surface transit delays relative to Alternatives III, IV and IVA, although speeds would still be slower than at present (see Table E-4). In the China Basin area the Peninsula Commute Service extension undergrounding would eliminate delay to buses as in Alternatives V and VI with grade crossings. In this alternative, the Muni Metro turnback design and impacts would be the same as in Alternative III, resulting in decreased Muni Metro subway capacity.

In Alternative VA the E-Line would be on Hyde Street between Beach and Jefferson Streets rather than on Leavenworth Street as in Alternatives III, IV, V and VI. While the overall transit impacts are similar, the Hyde Street alignment would have a greater adverse impact on transit operation than the Leavenworth Street alignment due to steeper grade.

h. Alternative VI

Alternative VI is similar to Alternative V except that the E-Line, rather than the Muni Metro extension, would extend to the existing SP Depot and the Embarcadero Freeway would be retained.

Transit accessibility would be identical to that afforded by Alternative V except that access to the South of Market and Mission Bay areas would be reduced due to loss of direct Muni Metro service and loss of in-station transfers from BART. Continuous transit service would be provided along the full length of the waterfront, but this would benefit relatively few trips.

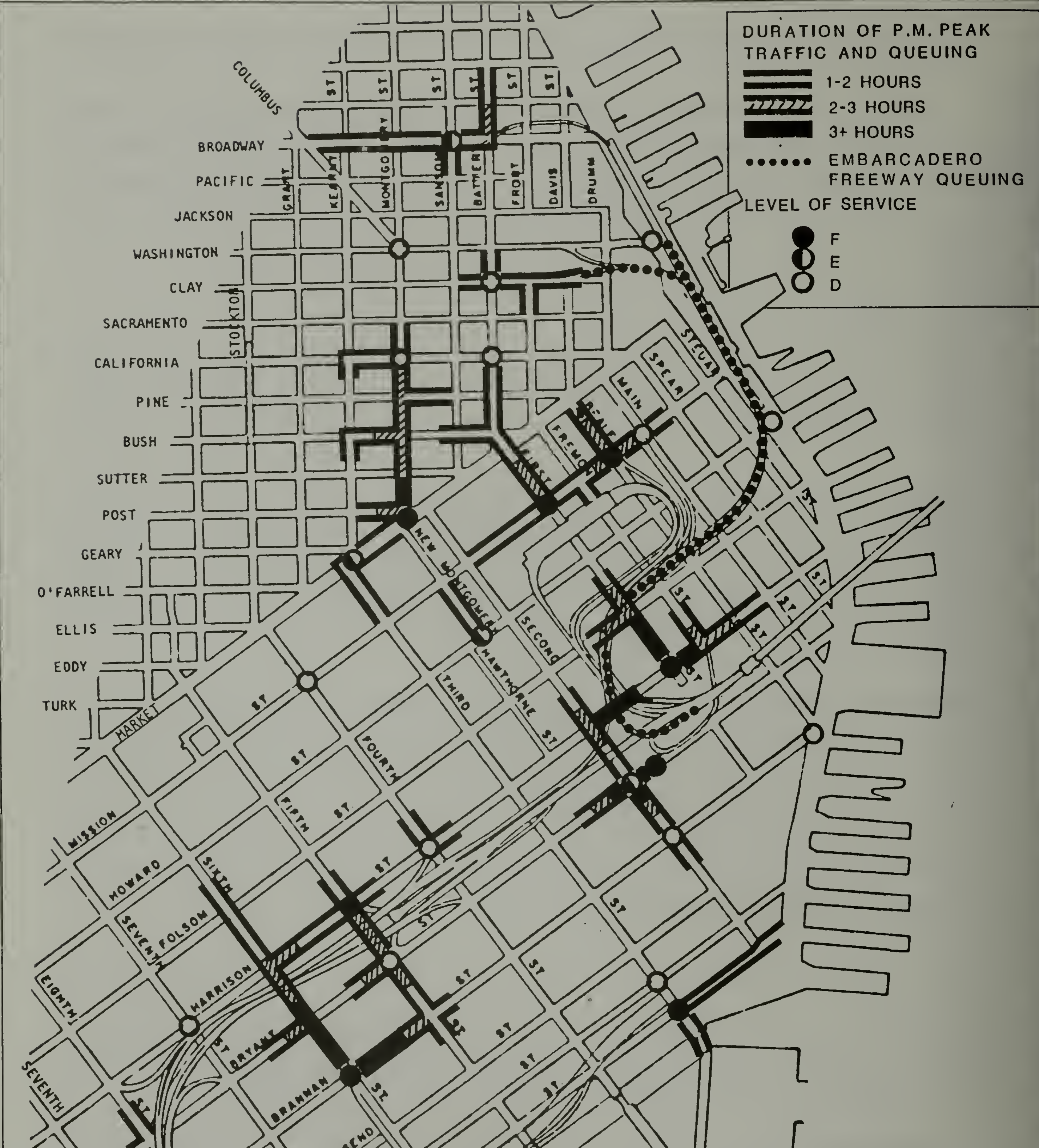
Projected overall ridership (E-Line, Muni Metro extension, Peninsula Commute Service) is about 17% less than for Alternatives V and VA, but is still comparable to Alternatives III and IV. Peninsula Commute Service ridership would be slightly lower than in Alternative V, while E-Line ridership would be greatest among all alternatives (See Table E-2). With the SP Depot relocated, most access trips would be by walking, and Muni Lines 80X and 81X could be discontinued. Overall, this alternative would attract about 30% fewer trips from other Muni surface lines than Alternative V.

Local effects on surface transit operations would be somewhat improved from those of Alternative V. In particular, Lines 27 and 42 would benefit from less traffic congestion. Similar to Alternative II, the stub turnback would increase Muni Metro capacity and improve flexibility of operations and maintenance over existing conditions.

2. Traffic and Parking

a. Alternative I

Alternative I represents minimal investment in transportation improvements and generally leaves traffic and parking facilities as they are now. The greatest impacts on surface



SURFACE STREET PERFORMANCE: ALTERNATIVE I

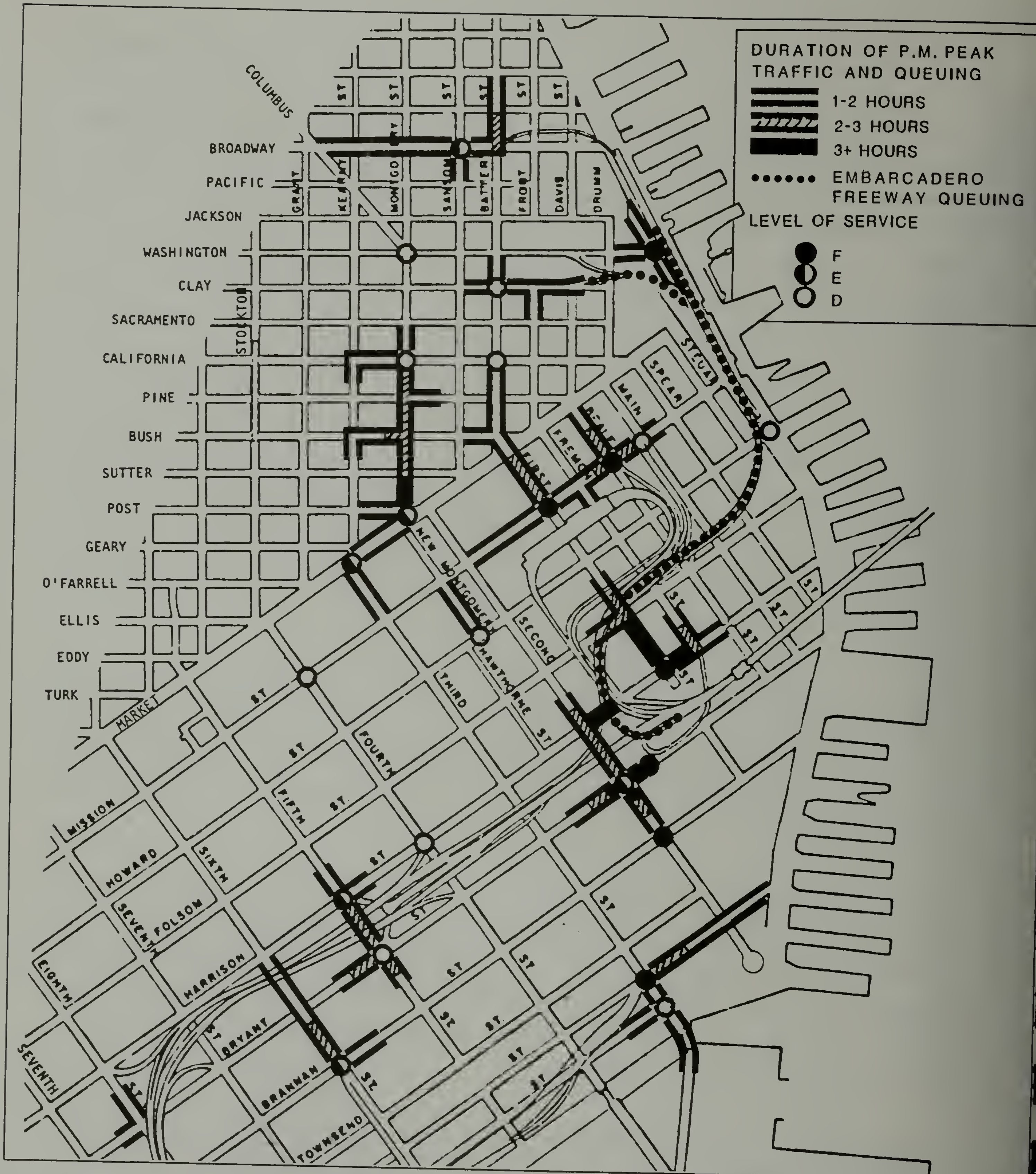
V-2

streets under this and all other alternative would occur during the evening peak period. For Alternative I, year 2000 traffic growth would increase street congestion (street queuing and intersection service deficiency) at locations where congestion presently occurs (Montgomery/Market, First/Mission, Beale/Mission, First/Harrison, Sterling/ Bryant, Sixth/Brannan) (see Figure V-2). Several additional intersections in the study area would operate at deficient levels of service (see Table IV-12 for level of service definitions) during the p.m. peak period. Furthermore, the duration of p.m. peak traffic congestion would increase from the existing 1-2 hours to 2-3 hours. In total, 37 congested intersections and 55 block-hours[11] of queuing would result from this alternative. A summary of year 2000 level of service, queuing, and duration of peak period, conditions is presented in Figure V-2. Figures V-2 through V-9 show the duration over which queuing would be observed at a particular location. For example, where these figures indicate a queuing period of three hours, it does not mean that individual vehicles would be delayed three hours. Rather, an observer at curbside would see a queue of slow moving vehicles for a full three-hour period. Surface street performance for each alternative is shown in Table V-9.

Table E-6 (Appendix E) summarizes peak period highway travel times for representative trips for each alternative. Local and regional mobility would be reduced under Alternative I by up to four minutes for some highway trips (representing about a 14% increase in existing travel time for a trip between the Transbay Terminal area and San Francisco State).

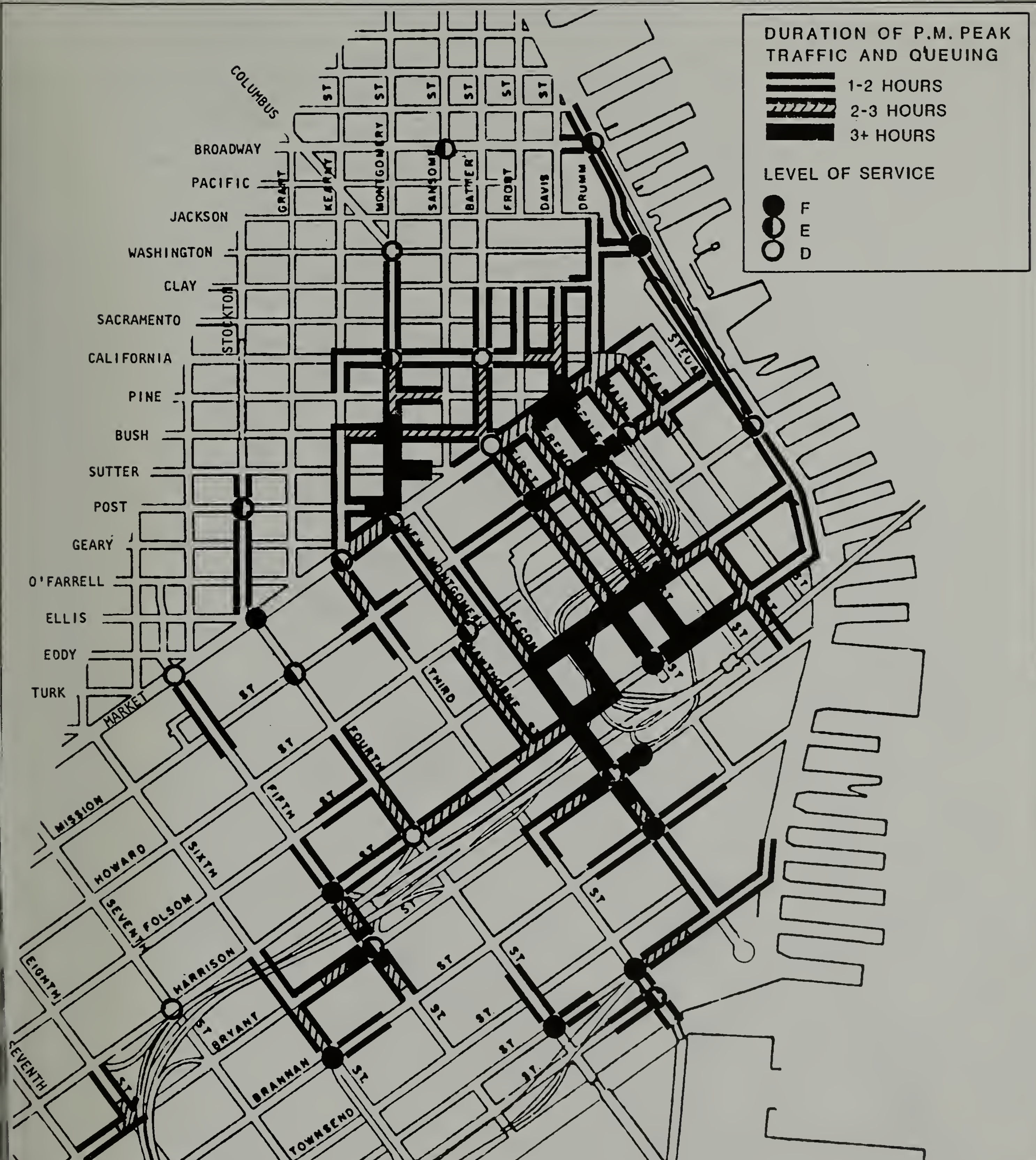
Impacts on freeway operation would be most critical during the morning peak period. Limited capacity on major highway corridors leading to the downtown (Bay Bridge, Golden Gate Bridge, Peninsula freeways) would constrain the projected year 2000 highway travel demand. Some highway trips would shift to other modes or to times outside the a.m. peak period. There would be sufficient downtown off-ramp capacity to serve projected a.m. peak vehicle volumes (see Table V-10).

Peak period travel time and delay would be reduced along the Northeastern Waterfront and its linkage with the Golden Gate Bridge due to additional intersection signalization and signal progression.



SURFACE STREET PERFORMANCE: ALTERNATIVE II

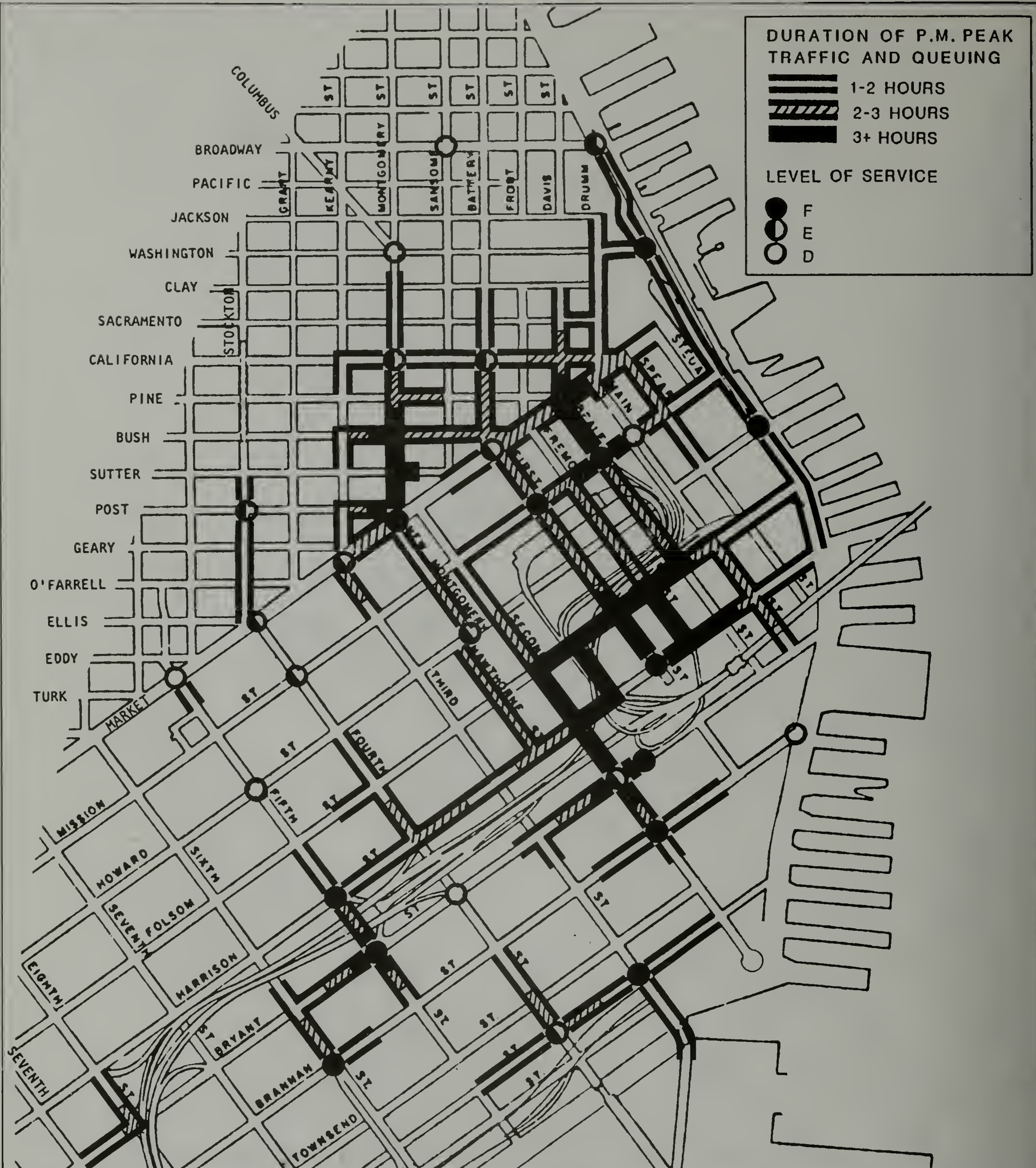
V-3



SURFACE STREET PERFORMANCE: ALTERNATIVE III

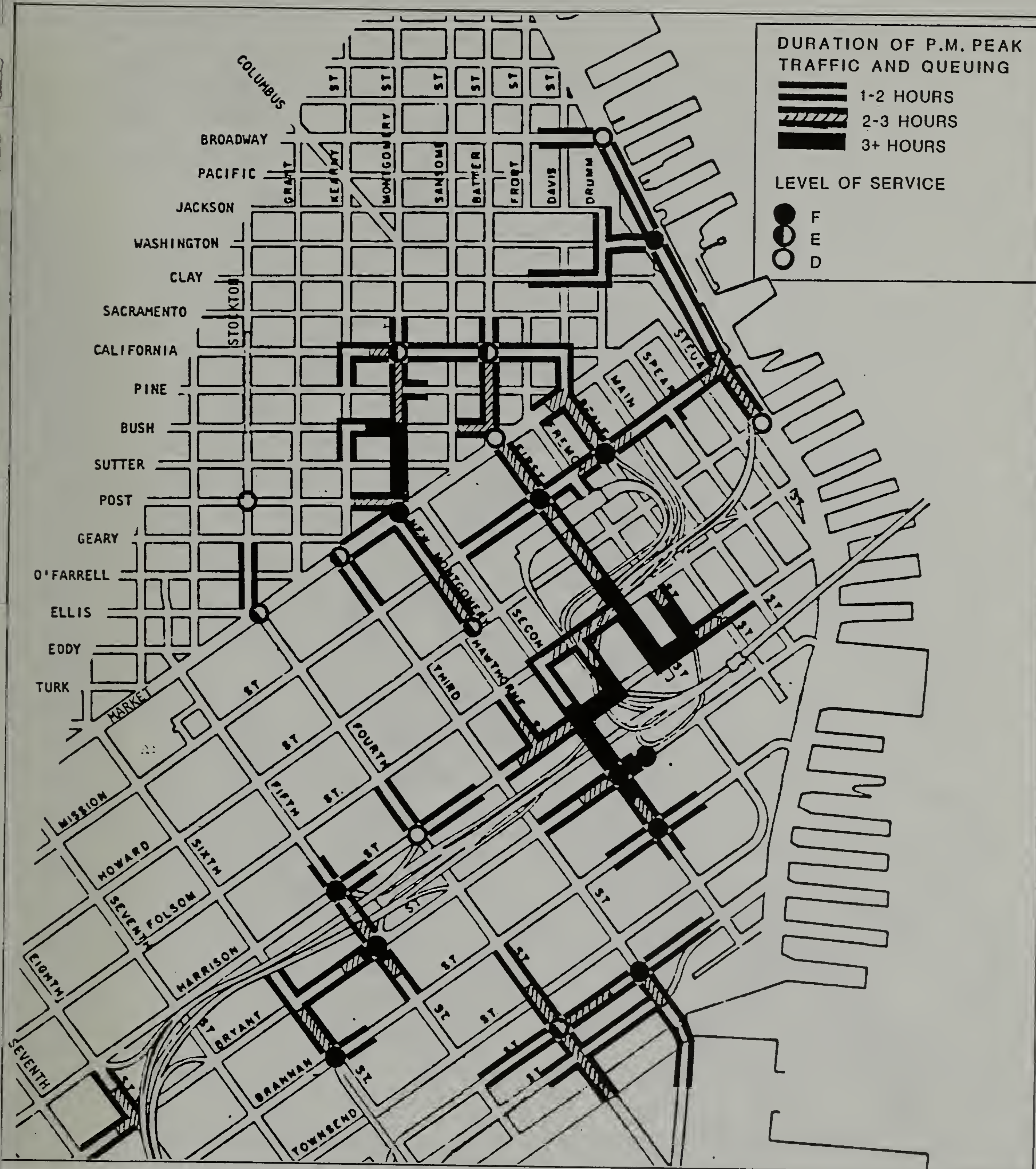
SCALE 0 400 800 1600 FEET

V-4



SURFACE STREET PERFORMANCE: ALTERNATIVE IV

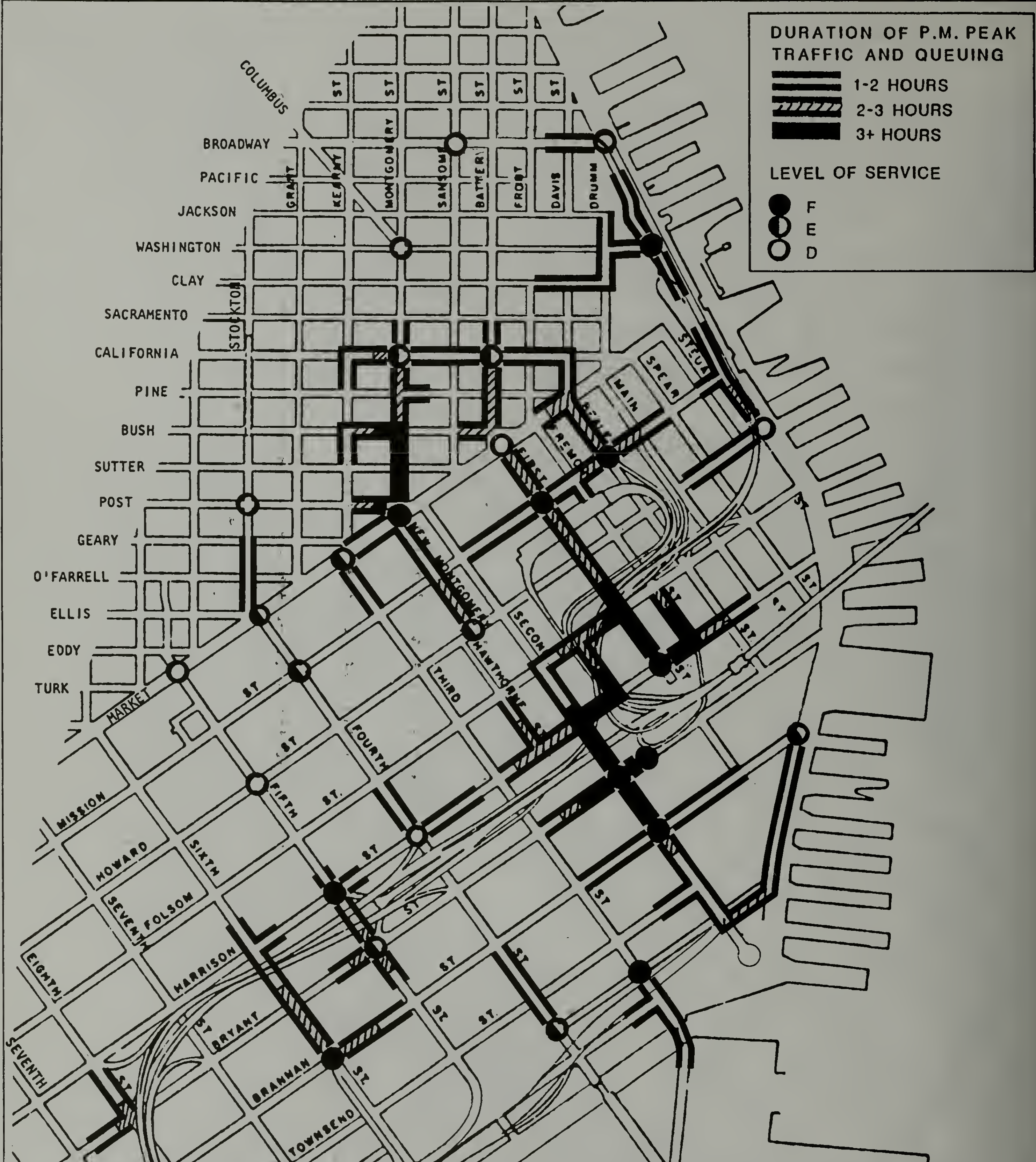
V-5



SURFACE STREET PERFORMANCE: ALTERNATIVE IVA

SCALE 0 400 800 1600 FEET

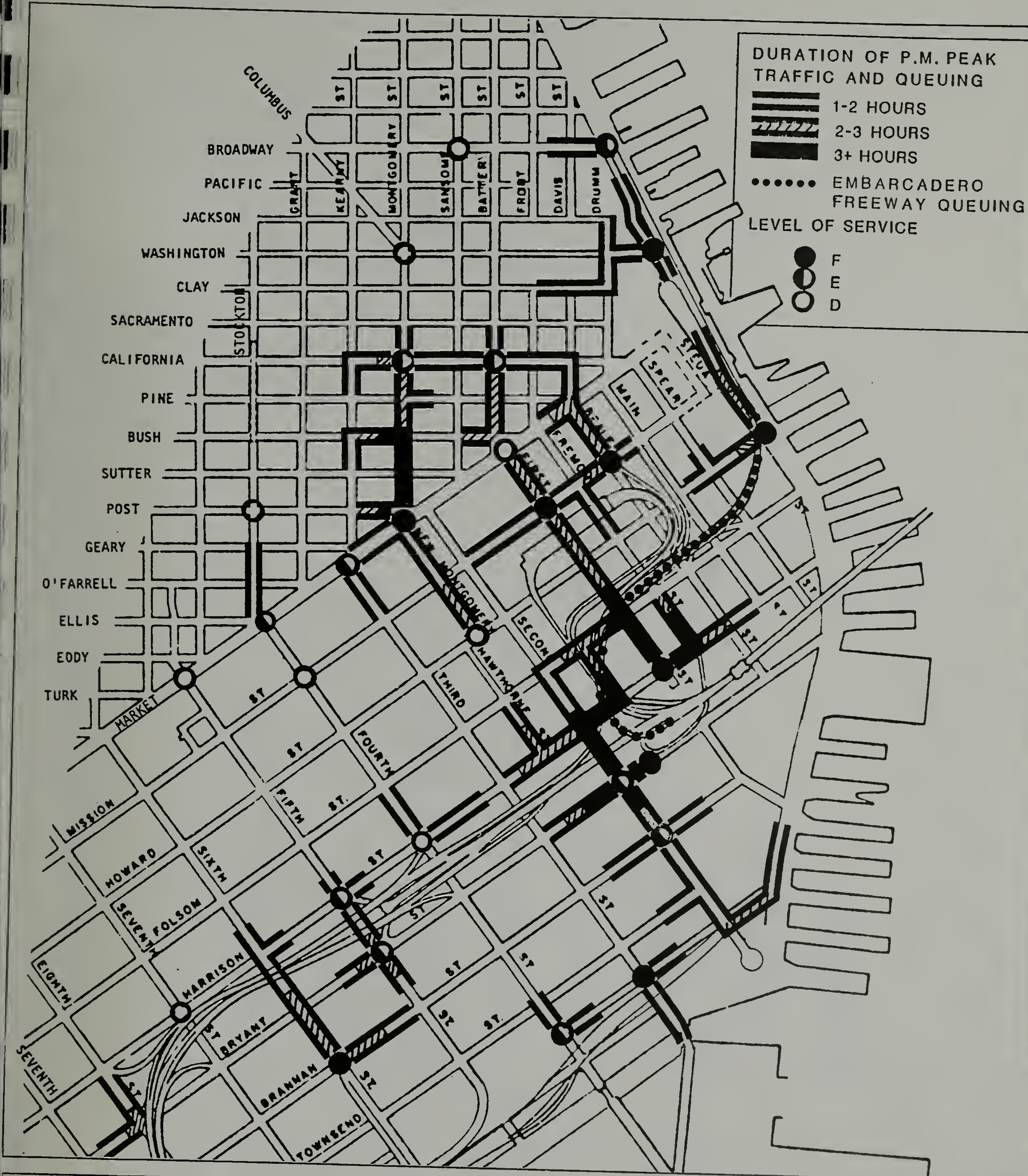
V-6



SURFACE STREET PERFORMANCE: ALTERNATIVE V

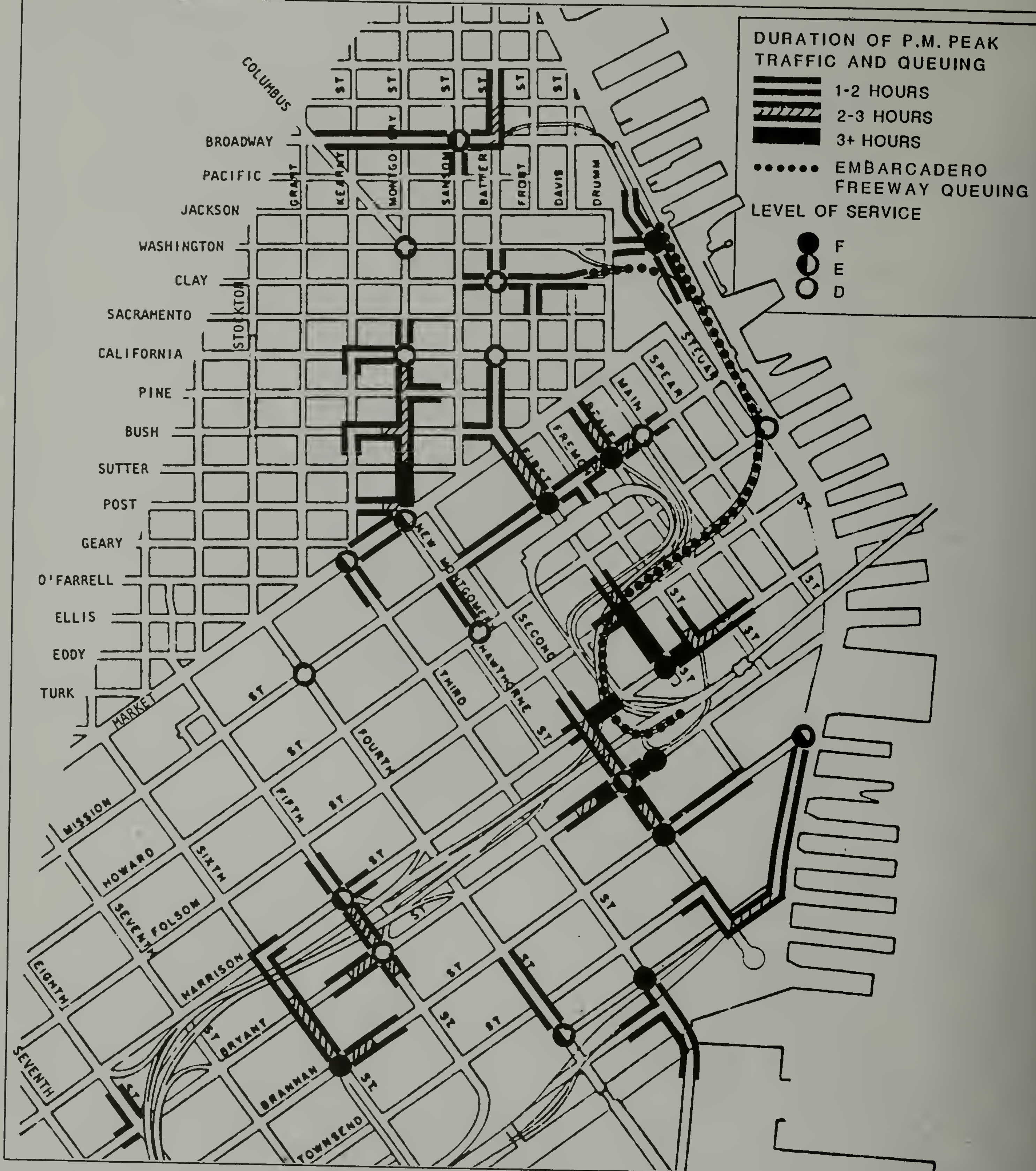
SCALE 0 400 800 1600 FEET

V-7



SURFACE STREET PERFORMANCE: ALTERNATIVE VA

V-8



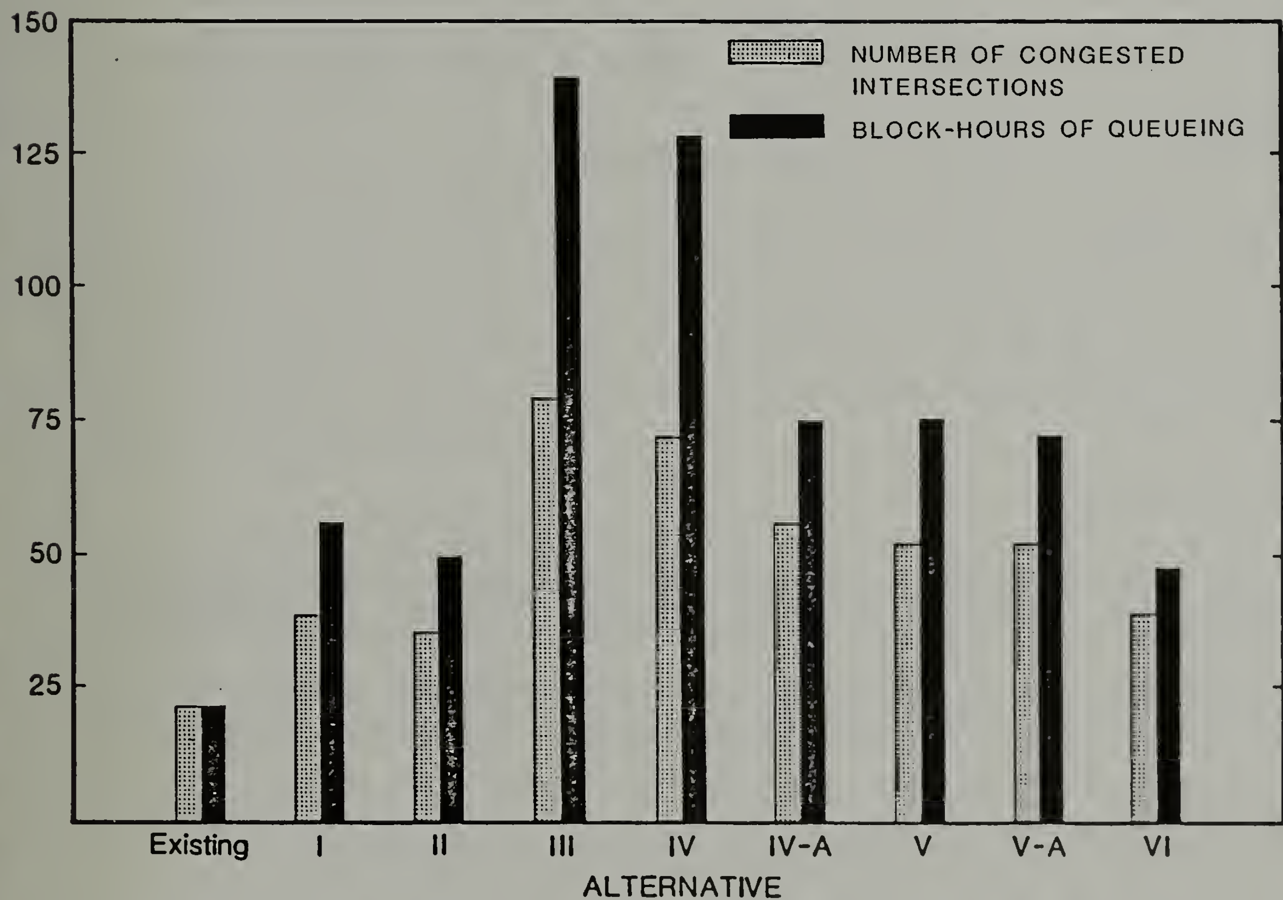
SURFACE STREET PERFORMANCE: ALTERNATIVE VI

SCALE 0 400 800 1600 FEET

V-9

Table V-9
SURFACE STREET PERFORMANCE
Year 2000 PM Peak Period

	Congested Intersections[1]	Block-Hours of Queueing[2]
Existing	21	20[3]
Alternative I	37	55[3]
Alternative II	34	49[3]
Alternative III	78	139
Alternative IV	71	128
Alternative IV-A	55	75[3]
Alternative V	51	75[3]
Alternative V-A	49	68[3]
Alternative VI	38	47[3]



1 The number of locations were queueing is projected to cross the intersection.

2 The summation of the number of blocks where queueing would be present multiplied by the number of hours duration.

3 Does not include queueing on freeways or ramps.

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IV-A and V-A (August 1983).

Table V-10
IMPACT ON FREEWAY SYSTEM[1]
Year 2000 AM Peak Hour — Off Ramps[2]

	I	II	III	IV& IVA	V& VA	VI
Bay Bridge - Westbound						
Capacity	5,000	5,000	3,040	3,940	3,940	5,000
Demand	4,030	4,030	3,820	3,880	3,880	4,030
Surplus/ Deficiency	+970	+970	-780	+60	+60	+970
Eastbound I-80						
Capacity	5,200	5,200	3,180	4,020	4,020	5,200
Demand	4,980	4,980	4,060	4,120	4,020	4,980
Surplus/ Deficiency	+220	+220	-880	-100	0	+220
Total Ramp Surplus/ Deficiency	+1,190	+1,190	-1,660	-40	+60	+1,190

(+)Capacity surplus

(-)Capacity deficiency

[1]Off-ramps analyzed included: Broadway, Washington, Main, Fremont (Harrison), Fremont (Folsom/Howard) and Fourth Street. Refer to Working Paper 1.5.6 (Chapter V).

[2]Capacity of Main Street off-ramp was reduced 10 percent to reflect greater demand and signal time for surface streets near the Financial District under teardown alternatives.

Source: DKS Working Paper 2.2.2 (Alternative VA), August 1983, pg. V-26.

There are approximately 28,000 off-street parking spaces in the project area. For Alternative I, reconstruction of the Embarcadero roadway between Broadway and Bay Streets would remove 80 metered (on-street) parking spaces. A comparison of the overall impacts on downtown parking of the alternatives is presented in Table V-11. The number of spaces developable under each alternative, rather than the number of spaces initially proposed, are shown to demonstrate the long term impacts of each alternative. The net gains or losses shown in the table are for the project area as a whole. Impacts on specific locations in the project area (Fisherman's Wharf, Ferry Building area, downtown, south of Market Street, China Basin) would vary significantly, as added spaces in the China Basin area would not replace spaces removed from Fisherman's Wharf.

b. Alternative II

As shown in Figure V-3, impacts would be only slightly improved relative to those of Alternative I. Provision of a new on-ramp to I-280 would significantly reduce congestion on the Sixth Street on-ramp approach during the evening peak hour. Some queuing would occur near the new on-ramp, but the overall duration of peak traffic conditions would be less. Approximately 34 congested intersection and 49 block-hours of queuing would result from this alternative. The new on-ramp would increase southbound I-280 freeway traffic during the evening peak period, causing additional delays approaching the current Army Street bottleneck. As shown in Table E-6, highway travel times would only differ by a minute or two from those for Alternative I.

The exclusive bus lane along the Embarcadero roadway and Jefferson Street north of Bay Street would reduce capacity for auto access to the Fisherman's Wharf area. The Jefferson Street Transit Mall option of this alternative would not reduce overall vehicular capacity within the Fisherman's Wharf area. With transit concentrated on Jefferson Street, auto traffic would be able to flow with less restriction on Beach Street, improving the quality of both bus and auto traffic. Local access and circulation would be preserved by two circulation loops.

Reconstruction of several complex intersections would improve operation and traffic safety on the Embarcadero roadway. As with Alternative I, currently programmed TSM improvements along the Northeastern Waterfront would help to reduce peak period travel time and delay.

Table V-11

OVERALL IMPACTS ON DOWNTOWN PARKING

	I	II	III	IV	IV-A	V	V-A	VI
Number of Study Area Spaces Removed[1]	80	1,240	1,440	1,450	1,650	1,440	1,540	1,340
Number of Study Area Spaces Added[2]	0	1,500[4]	3,600	3,600	3,600	1,900	1,900	1,900
Net Gain (Loss)	(80)	260	2,160	2,150	1,950	460	360	560
Additional Downtown Commuter Parking Demand[3]	5,400	5,400	4,100	4,100	4,100	3,900	3,600	5,000
Maximum Percent of Downtown Demand Increased Satisfied by New Study Area Spaces	0	5	53	52	48	12	10	11

[1]Parsons Brinckerfhoff Quade and Douglas, Inc., I-280 Transfer Concept Program Subtask 2.2.2: Transportation Performace Measures, for Alternative VA prepared for the California Department of Transportation, August 1983, Table V-17, page V-29.

[2]Ibid., Table V-18, page V-30. Assumes multi-level parking structures, and is therefore maximum gain.

[3]Assumes one space per additional peak period auto trip by year 2000. Excludes Mission Bay.

[4]Because Alternative II is a 'low cost' alternative, this estimate assumes that only surface parking would be provided at intercept parking locations.

Source: DKS, Working Paper 2.2.2 (Alternative VA), August 1983, pg V-32

Approximately 1,240 parking spaces would be removed due to exclusive bus lanes on Beach and Jefferson Streets, Embarcadero roadway reconstruction and the new I-280 ramp. An additional 1,500 spaces could be added as intercept parking under this alternative, resulting in a net gain of 260 spaces. While the added spaces would not substitute totally the spaces removed, particularly those in the Fisherman's Wharf area, the net gains could satisfy about 5% of additional downtown commuter parking demands due to employment growth between 1982 and 2000 (see Table V-11).

c. Alternative III

Alternative III would result in the greatest number of congested intersections of all the alternatives, more than doubling the number of congested intersections associated with Alternative I, the No Project Alternative (see Table V-9 and Figure V-4). Nearly 4,000 additional vehicle trips would be placed on surface streets to and from the freeway in the evening peak hour. On-ramps at Fifth/Bryant, Fourth/Harrison and Eighth/Harrison would become congested. Heavy traffic and queuing would occur on every street crossing Market Street from Fifth Street to the Embarcadero roadway. For a period of over three hours, extensive surface street backups approaching all ramps to the Bay Bridge would occur due to year 2000 traffic growth and displaced Embarcadero Freeway trips. Alternative III would impact access to activity centers such as Fisherman's Wharf and Chinatown, which presently use the Embarcadero Freeway. Highway travel times would be up to nine minutes longer for this alternative relative to Alternative I (see Table E-6). This would be more than a 50% increase in travel time for trips between Fisherman's Wharf and the SP Depot area.

In the absence of replacement freeway ramps, off-ramps serving the Financial District would be unable to accommodate the demand from the Bay Bridge and Bayshore Freeway during the a.m. peak. Some trips would divert to other ramps; however, reduced capacity would increase freeway congestion, particularly on the upper deck of the Bay Bridge during the a.m. peak which would delay autos and AC Transit buses. Queuing in the a.m. peak could be expected to extend for over a mile on the Bay Bridge east of the Fremont Street off-ramp.

In Alternative III, the design variation of realigning Berry Street between Second and Third Streets would provide a more direct connection between the I-280 off-ramp and the Embarcadero roadway. It would benefit traffic service by removing some traffic from the Third/King intersection and eliminating weaving on Third Street.

The E-Line and Muni Metro extension rail transit lines would delay other traffic at grade crossings. The impacts of currently programmed TSM improvements would be similar to Alternatives I and II.

Approximately 1,440 parking spaces would be removed due to Embarcadero roadway reconstruction and development of Muni Metro extension and E-Line rail transit right-of-way. An additional 3,600 spaces could be added as intercept parking, resulting in a net gain of 2,160 spaces for the study area. This could help to satisfy about 53% of future downtown commuter parking demand (see Table V-11). However, about 280 spaces removed from Fisherman's Wharf area are not replaceable by the added spaces.

d. Alternative IV

As shown in Table V-9 and Figure V-5, surface street congestion and queuing at freeway ramps during the p.m. peak period due to Embarcadero Freeway removal would be similar to Alternative III. Alternative IV would result in 71 congested intersections and 128 block-hours of queuing. These impacts would be slightly less than Alternative III, but significantly greater than Alternative I, the No Project Alternative. Provision of the new Embarcadero Freeway off-ramp would relieve some pressure at Fifth, Third and Fremont Streets. Near the I-280 Freeway, the new ramp pair on King Street would reduce the duration of queuing on the Sixth Street on-ramp due to provision of a new on-ramp at Fifth and King Streets. King Street itself would experience congestion approaching I-280 due to heavy vehicle volumes, conflicts with E-Line/Muni Metro extension operation and special signal phasing for buses exiting the three-lane bus stop adjacent to the Peninsula Commute Service Depot. Fourth Street and King Street would be particularly deficient, causing congestion in front of the Peninsula Commute Service Depot. Along the Embarcadero roadway the E-Line and Muni Metro extension rail transit lines would delay other traffic at grade crossings. Highway travel time would be about the same as for Alternative III (see Table E-6).

The replacement Embarcadero Freeway off-ramp would significantly improve a.m. freeway operations relative to Alternative III. However, there still would not be enough overall off-ramp capacity to accommodate demand in the morning peak hour. Resulting congestion on I-80 would add one to two minutes of vehicle delay compared to Alternative I. As with Alternative III, queuing in the a.m. peak could be expected to extend for over a mile on the Bay Bridge east of the Fremont Street off-ramp. Provision of the

replacement off-ramp would also provide better freeway access compared to Alternative III for activity centers such as the Port, Chinatown and Fisherman's Wharf. However, lack of a complementary on-ramp in the same location could confuse visitors.

The new I-280 on-ramp would allow increased southbound freeway volumes. As in Alternatives II and III, congestion would increase approaching the U.S. 101 interchange.

TSM impacts on peak period travel along the Northeastern Waterfront would be as described in Alternatives I and II. In addition, travel time and delay would be reduced along the Embarcadero roadway and King Street due to intersection signal interconnection. The North Point/Bay one-way couplet between Van Ness and Columbus Avenues would relieve congestion and improve access to the Fisherman's Wharf area.

Removal of parking and added intercept parking spaces would be nearly the same as in Alternative III (see Table V-11). Some additional parking would be lost in the Ferry Building area due to the new freeway off-ramp, while parking along Berry Street could be retained.

e. Alternative IVA

Surface street performance (see Figure V-6) would be worse than with alternatives which retain the Embarcadero Freeway. However, provision of replacement Embarcadero Freeway ramps would significantly reduce the amount and duration of queuing relative to Alternatives III and IV. Access to major activity centers such as Chinatown and Fisherman's Wharf would be improved compared to Alternatives III and IV. This alternative is similar to Alternatives III and IV in that highway travel times would be greater than Alternative I. However, travel times would generally be one to two minutes less in Alternative IVA, with some routes having time savings of up to six minutes compared to Alternatives III and IV (see Table E-6).

The replacement Embarcadero Freeway off-ramp would significantly improve a.m. freeway operations relative to Alternative III, similar to Alternatives IV and V. However, there still would not be enough overall off-ramp capacity to accommodate demand in the morning peak hour. Resulting congestion on I-80 would add one to two minutes of vehicle delay compared to Alternative I.

The new I-280 ramps near Fifth and King would provide direct access to the Financial District via Third and Fourth Streets, and would reduce queuing at the existing Sixth Street on-ramp. Heavy vehicle volumes and conflicts with E-Line/Muni Metro extension operation would cause congestion on Fourth and King Streets near the SP Depot and along the Embarcadero roadway. The new I-280 on-ramp would allow increased southbound freeway volumes. Congestion would increase approaching the U.S. 101 interchanges as in Alternatives II, III and IV.

There are five key elements of Alternative IV-A which would affect surface street performance compared to Alternative IV. These include:

- Conversion of Third and Fourth Streets to two-way in the China Basin Area. Projected evening peak demand crossing Mission Creek Channel would be heavy (2,600 vehicles per hour southbound) causing congestion in the vicinity of SP Depot with this street plan.

- Along Third and Fourth Streets, the distance between the King and Berry Streets would be small. This would not allow adequate vehicle storage area and would result in congestion during peak periods. Congestion would be further increased because of two-way traffic operations, with associated turning movements along Third and Fourth Street.

- One-way Howard Street would simplify intersection operation and increase capacity on the Embarcadero approaching the new freeway ramp. However, additional vehicle traffic would use Mission Street which would affect transit flow during the evening peak period.

- The Embarcadero northbound would be the critical capacity approach at Washington Street during both a.m. and p.m. peak hours since it would be two lanes. With added traffic from replacement on- and off-ramps, this would result in congested traffic flow.

- The Jefferson Street transit mall would not reduce overall lane capacity to access Fisherman's Wharf while providing clear definition of auto circulation separate from transit/pedestrian zones. Potential queuing near the Pier 39 garage would potentially disrupt traffic flow toward Fisherman's Wharf from the Embarcadero roadway.

Removal of parking would be slightly greater than Alternative IV (see Table V-11). Some additional parking would be lost in the Ferry Building area due to the new freeway on-ramp and the opening of Mason Street in the Fisherman's Wharf area. The impacts of TSM improvements under this alternative would be as described in Alternative IV.

f. Alternative V

Surface street performance (see Figure V-7) would be worse than with Alternatives I, II and VI, which retain the Embarcadero Freeway. Of the alternatives which provide for removal of the Embarcadero Freeway (Alternatives III-VA), Alternative V would have the second least impact on intersection congestion (51 congested intersections) and queuing problems (75 block-hours of queuing). As with Alternative IVA, queuing would be largely reduced on Harrison, Folsom, the Embarcadero, Beale, Fremont and Spear Streets. All streets near the James Lick Skyway would have less congestion than Alternatives III or IV due to the replacement on-ramp attracting a significant amount of the removed Embarcadero Freeway traffic. Access to major activity centers such as Chinatown and Fisherman's Wharf would be improved compared to Alternatives III and IV. Similar to Alternative IVA, highway travel times would also generally be improved relative to Alternatives III and IV (see Table E-6).

The new I-280 touch-down ramps at Second and King Streets would provide improved access to the Embarcadero roadway and would reduce queuing at the existing Sixth Street on-ramp. Because of the location of the I-280 touch-down ramps, this alternative would not provide good freeway access for traffic from west of Montgomery Street or from new developments in the China Basin area west of Second Street (e.g., Mission Bay project).

The Peninsula Commute Service extension and Muni Metro extension would restrict street access between the Embarcadero roadway and the South of Market area. Frequent motor vehicle delays would occur during peak periods at railroad grade crossings, most notably on Brannan, Third and Fourth Streets.

Morning peak freeway operation would be similar to Alternative IV, except queuing problems for more than one mile on the Bay Bridge would not be expected.

Approximately 1,440 parking spaces would be removed to accommodate the E-Line, Peninsula Commute Service extension, Embarcadero roadway reconstruction, and new freeway ramps (see Table V-11). An additional 1,900 spaces could be provided as intercept parking, resulting in a net gain of 460 spaces. This would accommodate 12% of future downtown parking demand. However, the spaces removed from the Fisherman's Wharf area would not be replaceable by added spaces. TSM impacts would be similar to Alternative IV.

g. Alternative VA

Surface street performance would be worse than with Alternatives I, II and VI which retain the Embarcadero Freeway. As in Alternatives IVA and V, provision of replacement ramps to I-80 would significantly reduce the amount and duration of queuing relative to Alternatives III and IV which remove the Embarcadero Freeway but do not provide new on-and off-ramps to I-80 (see Figure V-8). Table V-9 shows that of the alternatives which include removal of the Embarcadero Freeway, Alternative VA would have the least impact on intersection congestion (49 congested intersections) and queuing problems (68 block-hours of queuing). Access to major activity centers such as Chinatown and Fisherman's Wharf would be improved compared to Alternatives III and IV with the replacement ramps and six-lane Embarcadero roadway. Highway travel times would be almost identical to Alternative V (see Table E-6).

Similar to Alternatives IV, IVA and V, the replacement Embarcadero Freeway off-ramp would significantly improve a.m. freeway operations relative to Alternative III. Since off-ramp demand would be nearly equal to capacity, some congestion would occur approaching San Francisco. Resulting congestion on I-80 would add one minute of vehicle delay compared to Alternative I.

The new I-280 roadway touchdown ramps at Second and King Street would improve access to the Embarcadero roadway and reduce queuing at the existing Sixth Street on-ramp. Traffic from downtown areas west of Montgomery Street and from new developments in the China Basin area west of Second Street would generally not be served by the new ramps since freeway access would be more direct via the Sixth Street ramps or the Fourth Street ramp.

The new I-280 on-ramp would allow increased southbound freeway volumes. Congestion would increase approaching the U.S. 101 interchange as in Alternatives II, III, IV and IVA.

There are two key elements of Alternative VA which affect surface street performance compared to Alternative V. These include:

- Closure of Mission Street at the Embarcadero roadway. Mission Street presently carries approximately 13,300 ADT and 1,100 p.m. peak hour vehicles (two-way) east of Main Street. This traffic would divert primarily to Howard Street in Alternative VA, degrading intersection operation of the Embarcadero roadway and Howard Street during p.m. peak conditions.

- PCS extension undergrounding in the China Basin segment would eliminate at-grade train conflicts with Third and Fourth Street auto movements. This would reduce queuing and congestion on Third and Fourth Street relative to Alternative V. Additionally, operation of the Brannan Street intersection with the Embarcadero roadway would be improved because of the elimination of the at-grade Peninsula Commute Service extension crossing. However, such conflicts would still occur between Muni Metro vehicles and autos along the Embarcadero roadway in the area south of Market Street.

Removal of parking would be slightly greater than Alternative V (see Table V-11). Some additional parking would be lost in the Ferry Building area due to Mission Street closure. TSM impacts would be similar to Alternative IV.

h. Alternative VI

Impacts of Alternative VI (see Table V-9 and Figure V-9) would be similar to Alternatives I and II. Evening peak traffic conditions north of Market Street would be affected only by year 2000 traffic growth; the new I-280 touch-down ramps at Second and King Streets would provide improved access to the Embarcadero and would reduce queuing at the existing Sixth Street on-ramp, as in Alternative V. They would not serve traffic from downtown west of Montgomery Street or from the China Basin area.

There would be sufficient downtown off-ramp capacity to serve projected year 2000 morning peak freeway volumes, as in Alternatives I and II. Traffic volumes and congestion would increase on southbound I-280 due to the added on-ramp capacity.

Less frequent service on Muni rail transit south of Market (E-Line alone instead of Muni Metro extension or E-Line/Muni Metro extension) would result in fewer conflicts and delays for autos compared to Alternatives III, IV and V. The Peninsula Commute Service extension would cause frequent motor vehicle delays at grade crossings during peak periods.

Approximately 1,340 parking spaces would be removed for Alternative VI. An additional 1,900 intercept parking spaces would be provided, resulting in a net gain of 560 spaces (see Table V-11). This would accommodate about 11% of future parking demand. As with all other alternatives, not all removed spaces would be replaceable with added spaces, particularly those removed from the Fisherman's Wharf area. TSM impacts would be the same as described in Alternative IV.

i. **Overall Travel Time Measures**

Overall travel time differences among alternatives were evaluated by weighting net travel time increases or reductions for highway and transit travel by the estimated number of peak period trips involved.

To accomplish this, average increases or decreases from existing peak period travel times due to street congestion or transit improvements were multiplied by the appropriate year 2000 p.m. peak period person trip volumes. The volumes by mode were derived from the year 2000 forecasts of trip generation and modal split in the downtown area, and include the effects of projected capacity constraints in key corridors (see Section IV.C Transportation Environment).

Representative travel time increments, by mode, were then chosen for each trip movement based on travel times summarized in Tables E-1 and E-5. The highway times include the effects of surface street and freeway ramp congestion, while the transit times include the effects of transit improvements as well as surface street congestion. It should be noted that although the surface street analysis (see Sections V.C.2.a - V.C.2.h) accounts for congestion, it is assumed that intersections are not blocked and therefore not affecting cross traffic. In order to maintain clear intersections extensive manual traffic control of major freeway access corridors could be required. Without such manual traffic control, intersection blockage could occur thereby disrupting cross traffic.

Table V-12 summarizes for each alternative, the additional (or reduced) person-hours of travel time relative to person-hours that would be expended by year 2000 travelers assuming existing trip times. The delays estimated for Alternative I are attributable only to increased congestion caused by downtown growth, as the alternative includes no changes in roads or transit service. Surface street delays are reduced in Alternative II by providing an additional I-280 on-ramp and exclusive bus lanes along the Embarcadero to reduce trip times relative to Alternative I.

The positive effects of transit improvements in Alternatives III and IV are more than offset by increased delays on surface streets due to the Embarcadero Freeway teardown. These delays affect surface transit passengers as well as highway users. Alternatives IVA, V and VA provide an additional freeway on-ramp which reduces street delays, and in Alternatives V and VA the Peninsula Commute Service extension increases transit

Table V-12

COMPARATIVE TRAVEL TIME IMPACTS[1]

Additional Person-Hours of Travel During Two-Hour PM Peak Period in the Embarcadero Corridor

	I	II	III	IV	IVA	V	VA	V1
Highway Users	2,400	1,900	5,400	5,300	4,200	4,500	4,600	2,400
Transit Users Due to Surface Street Effects	1,600	1,100	3,400	3,300	1,700	1,800	1,600	1,300
Due to Study Transit Improvements	-100	-600	-1,500	-2,100	-2,100	-2,600	-2,700	-2,300
TOTAL	3,900	2,400	7,300	6,500	3,800	3,700	3,500	1,400

[1] Relative to year 2000 person-hours of travel calculated from existing travel times.

Source: DKS, Working Paper 2.2.2 (Alternative VA), August 1983, page V-9.

benefits. Of all the alternatives which include Embarcadero Freeway removal, Alternative VA offers the least increase in person travel hours. The lower total delay for Alternative VI indicates that the improvements included under this alternative would handle the projected increased downtown traffic at levels of service nearly comparable to existing conditions.

Under Alternatives III-VA, which include Embarcadero Freeway teardown, the most severe total travel time impacts are due to the heavy volumes from the Financial District and Market Street area which will encounter increased delays accessing the freeways on the existing Beale/Mission and First/Harrison on-ramps. Trips from areas north of Market which currently use the Embarcadero freeway on-ramps would experience greater delays when they are forced to divert to other ramps (six to eight minutes versus three minutes), but their volumes are not as significant.

The transit routes most affected by surface street congestion under the freeway teardown alternatives will be those such as the 15-Line and 42-Line which travel north-south through the downtown on surface streets. In addition, transit routes along the Market and Mission Streets corridor would experience delays nearly as significant as the north-south transit corridors. Causes of this would be delays from crossing the heavily congested north-south corridor, and congestion from heavy transit volumes along the Market and Mission Street corridors.

The Peninsula Commute Service extension in Alternatives V and VI accounts for about 1,000 person-hours of p.m. peak travel time savings. Most of the difference between Alternatives VA and V may be attributed to this extension. The Transbay Terminal station location would provide better service to the large numer of Financial District trips, compared to the Rincon Annex which would better serve the Embarcadero Center area. The underground extension also helps to reduce grade-crossing delays to surface transit and vehicle trips south of Market compared to Alternatives V and VI. A minimal turnback facility which would allow headway reductions on the Muni Metro accounts for about 300 person hours of travel time savings in Alternatives II, III, V, VA and VI. The loop turnaround in Alternatives IV and IVA would allow reductions in headways and coupling and uncoupling delays, providing travel time savings of about 1,000 person hours. The Muni Metro extension is responsible for over 600 person-hours of travel time savings under Alternatives III, IV and IVA although SP Depot access trips are responsible for

The most valuable function of the E-Line from a travel time standpoint is to provide convenient transfer access to BART and Muni Metro. The E-Line would also provide convenient access between points along the northeastern waterfront such as between the Ferry Building, Fisherman's Wharf and Fort Mason. It would provide the most travel time benefits under Alternative VI when it is not supplemented by the Muni Metro extension.

3. Pedestrian Circulation

Pedestrian circulation is generally improved in Alternatives II-VI due to the Embarcadero roadway reconstruction. However, vehicle/pedestrian conflicts vary with each alternative. Alternative II would have the least impact on pedestrians since traffic volumes along the waterfront would be relatively low and the reconstruction of the Embarcadero roadway would provide defined walkways and safe, signalized crossings without barriers from traffic or transit. Alternative V would have the greatest negative impact on pedestrians for several reasons: Embarcadero roadway volumes would be high due to freeway removal; the Embarcadero roadway would be six lanes wide, increasing pedestrian exposure to vehicle conflicts; and the at-grade Peninsula Commute Service extension would act as a barrier to the waterfront.

Within the study area, pedestrian volumes near the Ferry Building are heavy due to ferry arrivals in the morning and projected activity from the rehabilitated Ferry Building complex. Table V-13 provides a comparison of pedestrian measures including volumes, walking distances and crossing times and traffic volumes for each alternative. Presently, pedestrian movement is protected by a signal at the foot of Market Street which is set to allow people to proceed across the Embarcadero without stopping. This would be maintained in Alternative I. With a reconstructed Embarcadero roadway in Alternatives II and VI, pedestrians could cross on one signal cycle. However, for teardown alternatives, the curb-to-curb distance is too long for a pedestrian to cross in one signal cycle. Pedestrians would need two signal cycles to cross from curb to curb, delaying people an additional 10 to 12 seconds, on the average, over Alternatives I, II and VI. Additionally, large vehicular volumes on the Embarcadero for freeway teardown alternatives would increase potential pedestrian/auto conflicts. Due to the large pedestrian and vehicular volumes for freeway teardown alternatives, particularly Alternatives IVA, V and VA which have higher vehicle volumes because of the replacement on- and off-ramps, it may be desirable to grade separate pedestrian flows. The crossing would connect the Ferry Building to Justin Herman Plaza and would reduce vehicle-pedestrian conflicts and

Table V-13

SUMMARY OF PEDESTRIAN CONDITIONS AT THE FERRY BUILDING

		Existing	I	II	III	IV	IVA	V	VA	VI
Pedestrian Volumes (Peak 15 Minute)	A.M.	460	470	470	500	500	500	500	500	500
	Noon	230	580	580	610	610	610	610	610	610
	P.M.	570	760	760	790	790	790	790	790	790
Crossing Distance - Feet (Curb-to-Curb)		230	230	72	102	114	105	126	126	100
Crossing Time-Seconds (Curb-to-Curb)		50	50	19	34	37	35 89 (grade separated)	40	40	24
Embarcadero Roadway Two-Way Volume	A.M.Hour	1,900	2,400	2,400	3,000	3,300	3,500	3,700	3,800	2,500
	P.M.Hour	3,200	3,800	3,800	4,600	5,100	5,500	5,800	5,900	3,900
	ADT	27,000	32,500	32,500	39,400	43,700	46,000	49,600	50,500	33,400

potential crowding on the Embarcadero median where the E-Line may stop, but would result in significantly longer crossing times (see Table V-13).

Other areas of relatively high pedestrian volume would be in the vicinity of existing and proposed transit stations and at Fisherman's Wharf along Jefferson Street. Alternatives V, VA and VI would result in reduced pedestrian activity near the existing SP depot. Peak pedestrian level of service near Fourth and Townsend Streets would improve from "impeded" as it is today to "unimpeded". In Alternative IVA, the Muni Metro extension would provide convenient access for passengers transferring between the Peninsula Commute Service and Muni Metro. In addition, a Fourth Street pedestrian undercrossing from the Muni bus stop on Townsend and possibly the E-Line (with the Wye design option) to the Peninsula Commute Service depot would eliminate pedestrian/vehicle conflicts. For other alternatives, pedestrian circulation at the Fourth and Townsend Streets Peninsula Comute Service depot would remain impeded.

In Alternative VA at the downtown Transbay Terminal, approximately 80% of the extended Peninsula Commute Service riders would walk to their final destinations. Pedestrian levels of service at Mission Street, which would already be "congested" in the future without the rail extension, would be further degraded by pedestrian crossing increases of up to 30%. Heavy pedestrian volumes at the Mission/First and Mission/Fremont intersections would negatively impact traffic operation at these intersections. One possible mitigation measure would be a pedestrian bridge across Mission Street. The existing preferred alternative for the Transbay Terminal includes a provision for a pedestrian bridge.

In Alternative IVA and Alternative II (design option for the E-Line bus with two-way operation along Jefferson Street), the Jefferson Street transit mall would provide an auto-free area in Fisherman's Wharf, thus enhancing the pedestrian environment and reducing conflicts with traffic.

4. Goods Movement

Alternatives II-VI would have the same general impact on reduction of direct accessibility to waterfront piers. The Embarcadero roadway reconstruction with medians constrains direct access for trucks, requiring additional turn movements. A new I-280 on-ramp in the China Basin area would improve freeway accesss for Alternatives II, V, VA and VI, but

removal of the Embarcadero Freeway would reduce access to the I-80 freeway for Alternatives III and IV. Even though Alternatives IVA, V and VA include removal of the Embarcadero Freeway, the new on- and off-ramps directly connect to the Embarcadero roadway, thereby simplifying access to the waterfront compared to the existing ramps which are oriented toward the Financial District.

Alternatives II-VI all remove truck loading zones in the Fisherman's Wharf area to accommodate exclusive transit lanes. Alternative II would have less impact since truck loading could occur in morning hours with E-Line bus service operating in mixed flow.

Conflicts between trucks and autos would increase for Alternatives III-VA due to higher traffic volumes along the Embarcadero roadway from teardown of the freeway. Alternatives I, II and VI, which do not involve removal of the Embarcadero Freeway, would have no impact on trucks and auto conflicts. Transit/truck conflicts would increase north of the Ferry Building for Alternatives III-VI where the E-Line operates in the median, requiring trucks to cross streetcar tracks. Compared to Alternatives II, III, IV, V and VI, Alternatives IVA and VA improve truck access along the Embarcadero roadway. Alternative IVA would provide additional median breaks and additional southbound left turn lanes between Piers 9 and 35. Alternative VA would provide an additional median break at Vallejo Street and provision of a southbound left turn lane near Pier 35. As a mitigation to reduce truck access along the Embarcadero roadway, traversible medians could be constructed where truck turns are required. This could result in increased vehicular conflicts along the Embarcadero roadway.

In Alternative IVA, closure of Beale Street would limit access to the Bay Bridge to Bryant Street in the Rincon Hill/South Beach segment. Pedestrian conflicts with trucks in the Port area would be reduced for all alternatives except Alternative I since the Promenade, new sidewalks and signalized crosswalks along the Embarcadero roadway would organize pedestrian flows and reduce exposure to trucks. Along in-land portions of the project corridor, trucks would experience similar delays as other vehicular traffic (see Chapter V.C.2).

D. PHYSICAL ENVIRONMENTAL IMPACTS AND MITIGATION

This section provides a discussion of the physical environmental impacts of the proposed alternatives. The impacts are grouped into six areas: soils, geology, and seismic risk; hydrology and water quality; energy; air quality; noise and vibration; and ecology. Mitigation measures to reduce or eliminate adverse impacts are also described. This is because in most cases, the way one element is treated in one alternative acts as a mitigation to impacts from a different treatment in another alternative. The fold-out chart at the end of this report (Appendix G) graphically portrays the various elements and treatments included in each alternative.

1. Soils, Geology and Seismic Risk

Physical impacts related to soils, geology and seismic risk involve potential geotechnical problems associated with the foundation construction for the various treatments of each alternative. The impacts of specific elements and treatments for the entire corridor length are given in the text of the Working Paper prepared for the I-280 study.[12] Further information is found in the Response to Comments on the Working Papers and Working Paper Memorandum on Alternatives IVA and VA. The relative foundation construction impacts for each of the six geographic segments are presented in Tables 1 through 6 (pages 7-11) of Working Paper 2.2.3A, Soils, Seismicity and Geology, December 30, 1983. The effects of a specific treatment were ranked in terms of the amount of foundation construction activity, relative costs for the foundation requirements and the disruptive effect of foundation construction on the current environment. These factors were grouped into four major classes of effects: no effect, minimal effect, moderate effect and significant (major) effect. The "no effect" condition occurs when no soil, geology or foundation-related activity is required for a specific treatment of a given alternative. "Minimal effects" occur when a shallow excavation or a few piles are required for foundation preparation of the planned treatment. "Moderate effects" occur when special foundation treatments are necessary, such as the implacement of deep piles or excavation of unconsolidated fill for replacement with engineered fill. "Major effects" occur when deep excavations with shoring, dewatering and settlement monitoring are necessary and construction of the treatment requires an extended construction schedule. The Working Paper analysis is summarized in the following paragraphs.

a. I-280 Touch-Down

To construct any type of access ramp in the China Basin area, excavation through fill and Bay mud would be necessary to set the foundation on a firm supporting soil. A second option would be to drive piles through the fill and Bay mud to lower formations. Geologic/soils effects would be moderate for all alternatives. The demolition of sections of I-280 would have minimal effect on soils in the area but would generate substantial spoils to be removed to land fill sites (see Section V.F., Construction Impacts, for more detail).

b. Embarcadero Freeway

Minimal excavation would be necessary during the demolition of the existing freeway and therefore only minor effects would be expected on the soils and geology along most of the alignment. Reconstruction of access ramps in the Ferry Building area would have moderate geologic/soils effects as described for the I-280 touch-down. Following the demolition of pile-supported piers, hard spots may be present along the alignment where these piles were located. This could create adverse differential settlement of structures, such as light-rail lines or roadways along the freeway alignment. If an alternative involving freeway demolition is chosen, an evaluation of the potential differential settlement problem should be completed when the design alignment has been selected for the Muni light-rail line and the Embarcadero roadway. If no hard spots are crossed by either alignment, the evaluation would be unnecessary.

c. Embarcadero Surface Roadway

Reconstruction and widening of the existing Embarcadero surface roadway would require designs accounting for differential settlement. Such settlement could occur where the alignment passes over areas of Bay mud or the hard spots caused either by pile caps or where the roadway crosses the newly constructed underground sewer system. This would require minimal foundation work and would have minimal geologic/soils effects.

d. Muni Metro/Peninsula Commute Service Extension

The construction of the extensions would produce minimal effects where the rail lines are on the surface and major effects in areas where the rails are subsurface. Excavation of the existing roadway, installation of base aggregate, ties and rails, and regrading with asphalt or concrete would be necessary for the surface extension of the rail line. Rail

design would need to account for the effects of differential settlement in much the same fashion as is necessary for the surface roadway. Major effects would occur during construction of underground facilities, which would require excavations to 25 feet below sea level. Excavations of this depth would be needed in Alternatives III-VA. These activities can cause subsidence due to lateral ground movement and dewatering outside the excavation. Lateral ground movement into the excavation could be prevented by a properly installed shoring system to support the sides of the pit. Internal dewatering of the excavation would be necessary but need not cause significant groundwater drawdown outside the excavation if appropriate waterproofing and/or recharging techniques are used. This is discussed further in Hydrology and Water Quality, Section V.D.2. The extensive underground facilities proposed in Alternative VA would need careful advance planning and operational monitoring to assure the safety of nearby structures.

e. Muni E-Line Streetcar

Excavations along existing roadway for the Muni E-Line extension would have minimal effects similar to those discussed for the surface segments of the Muni Metro/Peninsula Commute Services extension. The tunnel section of the E-Line extension through Fort Mason already exists and would not need to be altered. The turnaround loop east of Laguna Street (Alternatives III-VI) would need an open cut in the hillside which might need to be supported during excavation since the hillside partially consists of previously filled land. The cut would probably not extend below the level of the fill.

f. Street and Ramp Modifications

For all alternatives minimal effects would be expected from the modification of streets along the Embarcadero Corridor since only shallow excavation (one to three feet) would be necessary for the addition of landscaped medians, street closures or signal boxes. Ramp modification could have moderate effects if the addition of piers or similar support systems were necessary where lanes were added to an existing elevated section. Minimal to moderate effects would be similar to those outlined for the I-280 touch-down.

g. Intercept Parking

The impacts of using either of the two proposed intercept parking sites depend on the type of structure proposed. The northwest half of the site at Harrison and Main is underlain by Franciscan Formation bedrock, whereas the southeast half is underlain by as much as 75

feet of fill. In Alternatives II-VI some differential settlement (minimal effects) would be expected between the two halves of this site if it were occupied by a surface parking lot consisting of asphalt or concrete laid over existing soil materials. A parking structure on the site would be founded partially on bedrock, partially on fill. This would need to be accounted for in foundation design since differential settlement (moderate effects) may be expected to occur between the foundations resting on the different subsurface materials.

The King and Third Street site is entirely underlain by 45 feet of fill and another 57 feet of undifferentiated unconsolidated sediments. In Alternative II the stub-end of the I-280 Freeway which crosses the site is being considered for use as a parking structure in conjunction with a surface lot constructed beneath the freeway section. Physical impacts related to this treatment would involve the construction of appropriate foundations to support access to and from the elevated parking area (moderate effects). The surface parking facility would require some excavation and recompaction of the existing fill to provide a base for concrete or asphalt resurfacing. Effects would be minimal to moderate depending on depth of excavation and location of supports and accesses for the existing elevated structure.

h. Seismic Hazards

Unengineered fill and younger Bay mud exists along the Embarcadero Corridor. Structures supported on these deposits would be subject to subsidence, overturning or collapse during a great earthquake (Richter magnitude 8 or greater) due to liquefaction of fill or propagation of mud waves. These major effects would be mitigated by designing all structures to meet the recommended lateral force requirements of the Structural Engineers' Association of California (as established in the Uniform Building Code and the San Francisco Building Code). This could include supporting structures on engineered fill or on piles which reach below weak soils.

Tsunami runups would range between 11.2 feet above mean sea level (msl) and 7.6 feet msl for the 500-year event (levels decrease farther from the Golden Gate Bridge). The 100-year event levels would range from 6.2 feet msl to 4.6 feet msl. Aquatic Park would experience flooding during any tsunami. Between 1.0 and 2.5 feet of flooding would be expected from Aquatic Park to Rincon Point during a 500-year event, but none during the

100-year event. None of the proposed alternatives would alter these predicted flooding depths. Access to all subsurface facilities would be above the 500-year event flooding level.[13]

Two reservoirs, the Francisco Reservoir and the Lombard Reservoir, are above the Fort Mason Aquatic Park segment of the Corridor. Any flooding from failure of these reservoirs would have minimal effects on the Fisherman's Wharf/Aquatic Park area. The two reservoirs contain a total of about 17-acre feet of water. This volume is less than critical according to the State Division of Reservoir Dam Safety. The tanks are on solid rock and survived the 1906 earthquake (Richter magnitude 8.3) without damage.[14]

2. Hydrology and Water Quality

Potential effects on water quality along the Embarcadero Corridor project area could arise from long-term effects (secondary impacts) or construction-related impacts. Long-term impacts include changing development patterns that would generate additional construction impacts and additional sewage; increased levels of oil, particulates and other motor-vehicle-related contaminants; and the introduction of debris from landscaping, rail vehicle brake sand, and street litter into the storm/sewer system. Construction-related impacts would vary from minimal (due to infrequent overflows) to major if dewatering during construction affected adjacent building foundations. Construction-related hydrology and water quality impacts are discussed in more detail in Section V.F. of this report.

The overall impact on the hydrology and water quality of the Embarcadero Corridor is related to the net increase in pollutants introduced into the Bay during the predicted average of ten overflows per year allowed along the Corridor. The capacity of the Eastside Collector system is 46 million gallons, but since the system is used for storage as well as transportation it is difficult to quantify the intensity of storm that would cause an overflow. The quality of water contained in the overflows varies with the season and the amount of wastewater/stormwater stored in the collector.[15]

Any alternative which contributed to the changing development patterns in the South of Market area would have secondary impacts related to construction and sewage generation. Increased sewage generation would be greatest where an office or housing complex replaced a vacant lot or building. Little net increase in sewage generation would occur where such a development replaced an industrial/commercial complex.[16] Stormwater runoff from construction sites could carry a variety of contaminants including asphalt, cement, aggregates, paint, joint compounds and crack fillers as well as litter from containers used on the sites. Street runoff would contain oils and heavy metals from automotive exhaust, particularly from large diesel engines used in trucks or motor coaches, as well as brake sand from light-rail vehicles and varying amounts of street litter.[17] Litter, sand and other large-sized particulate matter is removed from the streets by cleaners or from the storm/sewer system at the treatment plant and thus would have no effect on water quality in the Bay. The treatment system would be capable of handling the projected increase in sewage requirements from the secondary development in the South of Market area.[18]

The use of the deciduous trees, especially sycamore, already causes major catch basin maintenance problems for the San Francisco Clean Water Program. Leaf-clogged drains, particularly in the lowlying areas of the City where drainage is slow, such as along the Embarcadero Corridor, cause local flooding and require more cleaning staff than is currently available. The use of evergreen trees in landscaping has been strongly recommended by the San Francisco Clean Water Program to prevent exacerbation of the existing drainage problem.[19] The impact from introduction of particulates (street litter, sand, exhaust emissions) can be reduced by continuing the current street cleaning program. Additional maintenance may be necessary in areas south of Market Street which currently are not cleaned on a frequent basis.[19]

3. Energy

The key energy issue arising from the proposed project concerns the trade-off between increased energy for transit and decreased energy use for private automobile travel. Differences between the project alternatives arise largely from the manner in which this trade-off is handled. Several factors influence the energy use of the various modes of transportation involved in the proposed project, including:

- Quantity of travel by each mode
- Average speed of travel for each mode (including queuing)
- Fuel economy of each mode
- Maintenance cost of each mode

Quantity of travel is usually presented in terms of vehicle miles traveled (VMT). Table V-14 shows the changes in annual VMT for the transit lines most affected by the proposed project for each mode of transit. Table V-14 also shows the expected scheduled route speeds for the No. 32 and E lines. The proposed project would have an impact on other Muni lines which carry passengers along the same corridor. Such lines include the 80X, 81X, 42 and cable cars. Ridership on these lines could decrease as a result of improved service on competing lines. This in turn could decrease the number of transit vehicle miles traveled and lower fuel consumption if Muni reduces the service on these lines.

Average fuel economy information for each mode of transportation is shown in Table V-15. Speed correction factors, which adjust the average fuel economy figures to account for variations in average speed, were applied to account for predicted variations in

TABLE V-14[1] VMT SUMMARY

	I	II	III	IV,IVA	V	VA	VI
Transit Elements	#32 bus	E Bus	E Rail MMX	E Rail MMX	E Rail to Market St. MMX PCSX	E Rail to Market St. MMX	E Rail PCSX
Revenue Rate (million miles)	7.5	9.5	E-8.4 MMX-3.4	E-8.4 MMX-3.4	E-5.1 MMX-3.4 PCSX-2.65	E-5.1 MMX-3.4 PCSX-2.72	E-8.4 PCSX-2.65
Scheduled Average Route Speed for #32 E-line (mph)	10.1	11.5	13.5	13.5	12.5	12.5	13.5
Annual VMT							
Bus	156,100	375,200					
Rail E	--	--	347,900	347,900	211,200	211,200	347,900
MMX	--	--	182,900	182,900	182,900	182,900	--
PCSX	--	--	--	--	47,800	49,000	47,800
Existing Muni Lines to be Discontinued	--	--	80X	80X	80X 81X	80X 81X	80X 81X
Annual Auto VMT Reduction Compared with Alternative 1 (millions)	--	0.4	14.8	14.8	22.7	25.9	11.9

[1]MMX = Muni Metro Extension; PCSX = Peninsula Commute Service Extension; E = E-Line.

Source: DKS Associates.

Table V-15

ENERGY CONSUMPTION PER MILE FOR VARIOUS TRANSPORTATION MODES (YEAR 2000).[1,2]

Automobiles	.036	Gallons of Gasoline
Light Rail	12.5	Kilowatt Hours (Kwh)
Electric Trolley	3.2	Kwh
Street Car	5.3	Kwh
Bus	.32	Gallons of Diesel Fuel
Commuter Rail[3]	2.9	Gallons/train

[1] Data on light rail, electric trolley, street car and bus was obtained from C. K. Lu, Engineer, Parsons Brinckerhoff Quade & Douglas, Inc., San Francisco, telephone conversations, February 3, 1983 and June 24, 1983. These numbers are based on current Muni consumption rates.

[2] Automobile and commuter rail energy consumption rates were obtained from California Department of Transportation, Energy and Transportation Systems, Final Report, Sacramento, California, December 1978.

[3] Data obtained from Curtis Kamai, Chief, Rail Planning Branch, Caltrans, San Francisco, telephone conversation, February 7, 1983.

average route speed of the E and No. 32 bus lines. Average fuel consumption rates were used for rail transit since speed correction factors are unavailable for these modes. Fuel consumption by automobiles was calculated based upon total VMT and total number of vehicle hours of queuing for each alternative.

Data on maintenance energy costs for automobiles and buses indicate that such costs can reach up to 30% of the energy cost for fuel on a per mile basis. Maintenance energy costs for street car, LRV, and commuter rail in San Francisco are not readily available. For this reason maintenance energy costs have not been specifically included in the analysis.

Table V-16 summarizes the estimates of relative energy consumption for each alternative. Because of limitations in the data upon which the energy calculations are based, as noted in the preceding paragraphs, this table is best used to compare the energy consumption of competing alternatives. The table provides an indication of likely energy use; it does not present precise estimates of future energy consumption under each alternative.

The energy consumption estimates presented in Table V-16 are based upon predicted VMT totals, average route speeds, average fuel consumption rates (with speed correction factors applied to bus travel), and the amount of vehicle queuing on surface streets during the peak hour. A conversion factor of 10,239 BTU per kilowatt hour is included to account for losses in the generation and transmission of electricity. In Table V-16 the overall energy consumption estimates for each alternative are presented in terms of how much greater or less each is than Alternative I.

The results indicate that annual energy consumption would be greater under Alternative II than Alternative I by the energy equivalent of 980 barrels of oil. This relatively small increase is due to the increase in bus travel combined with a relatively small decrease in auto travel.

Alternatives III and IV would result in a reduction in annual energy use of the equivalent to about 1,600 and 2,100 barrels of oil, respectively, compared to Alternative I. This would be due, in large part, to the greater reduction in automobile VMT for these alternatives because of improved transit service of the Muni Metro and Muni E-Line routes. Alternative IVA would result in an annual reduction of 5,500 barrels of oil compared to Alternative I, largely due to the reduced amount of vehicular travel because of transit improvements and a more efficient roadway system.

TABLE V-16

CHANGES IN ANNUAL ENERGY CONSUMPTION WITH RESPECT TO ALTERNATIVE I[1]

	I	II	III	IV	IVA	V	VA	VI
Increase in Mass Transit Energy Use over Alternative I (billions of BTUs)	--	9.0	35	35	35	47	48	31
Reductions in Auto Energy Use Compared with Alternative I (billions of BTUs)	--	3.5	44	47	66	97	114	56
Change in Total Energy Consumption Compared with Alternative I (billions of BTUs)	--	5.5	(9)	(12)	(31)	(50)	(66)	(25)
Equivalent Barrels of Oil	--	980.0	(1,600)	(2,100)	(5,500)	(8,900)	(11,800)	(4,500)

[1] Includes energy consumption during queuing. Numbers in parentheses indicate decreased energy consumption compared to Alternative I.

Reductions in annual energy use under Alternative V would equal about 8,900 barrels of oil compared to Alternative I. This is due to a relatively large reduction in automobile VMT and the shorter E-Line route. Alternative VA would result in a reduction in annual energy use equivalent to about 11,800 barrels of oil annually compared to Alternative I. This would be the result of a larger reduction in automobile travel than would occur under Alternative V.

Annual fuel consumption for Alternative VI would be about 4,500 barrels of oil less than Alternative I. This is due to the somewhat smaller reduction in automobile travel than is predicted to occur under Alternative V and the longer E-Line route.

4. Air Quality

a. Methodology and Overview

The most important local air quality impacts would be caused by carbon monoxide concentrations on congested streets. The traffic analysis for the various alternatives indicates that a large number of streets would be affected. Traffic volumes and speeds were reviewed to identify the most heavily traveled and congested intersections which would be affected by the proposed project. Nine intersections were identified (see Table V-17) which appear to represent the full range of types of serious impacts which could result including emissions due to vehicle queuing near freeway entrances and exits; emissions from the proposed Embarcadero surface roadway; and combinations of emissions from surface and nearby elevated roadways.

Seven of the intersections studied are at locations significantly affected by the construction or removal of entrance or exit ramps to the freeway system. Another, Embarcadero/Mission, is at a location central to the proposed Embarcadero surface roadway and beneath the existing elevated freeway. Third/Market was selected to be representative of a busy intersection at a central downtown location. These nine include the most heavily traveled and congested intersections affected by the proposed project.

CO air quality at the intersections studied was predicted for peak-hour traffic, and highest eight-hour average traffic for worst-case meteorological conditions. Wind speed was assumed to be one meter per second, or about two miles per hour. Atmospheric stability, a measure of the atmosphere's capacity to disperse pollutants, was assumed to be Class E for the one-hour average and D for the eight-hour average.[20]

TABLE V-17
CURBSIDE CARBON MONOXIDE CONCENTRATIONS[1]

Intersection	1982		2000															
			Alt. I		Alt. II		Alt. III		Alt. IV		Alt. IVA		Alt. V		Alt. VA		Alt. VI	
	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr	1 hr	8 hr
Broadway/Sansome	19	10	16	7	16	7	10	6	10	6	10	6	10	6	10	6	16	7
Clay/Battery	19	9	12	6	10	5	10	5	10	5	9	5	9	5	9	5	10	5
Third/Market	18	9	12	6	14	6	14	6	14	6	14	6	14	6	13	6	13	6
Mission/Beale	18	8	12	5	12	5	16	6	16	6	14	6	14	6	12	5	14	6
Embarcadero/ Mission[2]	18	9	11	7	11	7	18	6	$\boxed{20}$	6	19	6	19	6	$\boxed{22}$	7	9	5
Harrison/Fifth	$\boxed{20}$	10	16	6	13	6	14	7	14	7	14	7	14	7	14	7	14	6
First/Harrison	15	8	9	5	9	5	12	5	12	5	12	5	11	5	11	5	9	5
Sixth/Brannan	$\boxed{33}$	10	$\boxed{26}$	7	18	7	18	7	19	7	19	7	19	7	18	7	19	7
Third/King	11	7	13	5	15	6	$\boxed{20}$	6	17	6	17	6	13	5	9	5	13	5
Background[3]	6.9	5.3	4.9	3.7	4.9	3.7	4.9	3.7	4.9	3.7	4.9	3.7	4.9	3.7	4.9	3.7	4.9	3.7

Source: EIP

[1] All figures are in parts per million (ppm). Federal standards for carbon monoxide concentration are 35 ppm for the 1-hour average and 9 ppm for the 8-hour average. State standards for carbon monoxide concentration are 20 ppm for the 1-hour average and 9 ppm for the 8-hour average.

[2] Includes emissions from the elevated freeway where appropriate.

[3] Background levels are included in all the above projections.

STANDARDS	8 HOUR	1 HOUR
Federal	35 ppm	9 ppm
State	20 ppm	9 ppm

Approaching the State Standard

Equal or Exceed the State Standard

Equal or Exceed Federal Standards

Wind direction was assumed to be at a 22.5° angle to the more heavily traveled street. All results were calculated for curbside locations. The model used for the calculations, CALINE3, is recommended by the California Air Resources Board (CARB).[21] Emission factors were generated using the CARB's EMFAC6C program[22] for an ambient temperature of 35° F. Background air quality concentrations were calculated by taking half of the highest value measured at the "hotspot" monitoring stations in 1979-1978 and projecting it for the years 1982 and 2000 in accordance with AQMP emissions estimates. These procedures are designed to create conservative estimates of worst-case CO air quality.

A screening analysis was performed to determine the potential for violation of the state 1-hour average standard for NO_2. CALINE3 was used assuming 100% conversion of NO (which is produced in a vehicle's engine) to NO_2 (which results from a series of chemical reactions which occur at varying speeds depending upon the concentrations of other pollutants, principally ozone, in the atmosphere). The CALINE3 estimates were used, along with the highest ozone concentrations in San Francisco in 1981, to determine if conversion of NO to NO_2 could result in a violation of the 1-hour average NO_2 air quality standard. The results indicated that no violation would occur even for the most heavily traveled and congested intersections. This result is consistent with past monitoring data on short-term NO_2 concentrations near roadways.[23]

b. Air Quality Impacts

The air quality modeling results presented in Table V-17 indicate that the estimated existing worst-case 1-hour average CO air quality at Sixth/Brannan (33 ppm) exceeded the state standard of 20 ppm. This relatively high value is a result of the conservative nature of the modeling methods, particularly when applied to slow-moving vehicle queues such as the one predicted for Sixth/Brannon. Estimates of existing 8-hour average CO air quality at Broadway/Sansome, Harrison/Fifth and Sixth/Brannan exceed the federal and state standard of 9 ppm, and at 3 other intersections CO air quality is predicted to equal the 8-hour standard.

No violations of federal air quality standards is predicted to occur under any alternative. A violation of the State's CO air quality standard is predicted to occur under Alternative I at Sixth/Brannon due to the continued heavy traffic volumes entering or leaving the

freeway at that location. CO concentrations are predicted to decrease compared to existing conditions at each of the locations studied, due largely to reductions in vehicular emission rates.

Air quality under Alternative II would be equal to or slightly better than Alternative I at most locations. Differences would be most apparent at Third/King where concentrations are predicted to increase due to increased traffic at the new entrance to I-280. All locations are predicted to comply with air quality standards. Concentrations at Broadway/Sansome and Sixth/Brannan would remain high due to freeway access at those locations. Regional air quality would be slightly degraded due to the increase in bus travel, but the amount would not be measurable.

For Alternative III a violation of the state 1-hour average CO standard is predicted to occur at Third/King caused by peak-hour increased traffic volumes and slow speeds due to congestion. An increase in CO would occur at the proposed Embarcardero surface roadway at Mission Street, compared to Alternatives I and II, but would not be large enough to cause a violation of air quality standards. Similar situations would occur at Mission/Beale and First/Harrison. In contrast, CO concentrations are predicted to decrease at Broadway/Sansome due to reduced traffic volumes.

The removal of the Embarcadero Freeway as proposed in Alternative IV would cause increased congestion on alternative routes during the peak hour. This is reflected in the predicted violation of the state 1-hour average CO standard at Embarcadero/Mission. No other violation of standards is predicted, although the state 1-hour average standard would be approached at Sixth/Brannan under worst-case conditions because of congestion at the freeway access point at that location. Alternative IVA is similar to Alternative IV south of Folsom Street and similar to Alternative V north of Folsom Street.

The impacts of Alternative V would be similar to Alternative IV, but with slightly less congestion and lower CO emissions at Misson/Beale and Embarcadero/Mission due to the larger capacity of the Embarcadero roadway. No violations of standards are predicted to occur, but peak-hour concentrations would approach the state 1-hour average standard at Sixth/Brannan. Concentrations at Third/King would be lower than Alternatives II and III because of the position of the I-280 entrance ramps.

The impacts of Alternative VA on local carbon monoxide (CO) air quality would be slightly less than those of Alternative V for each of the locations except at Embarcadero/Mission. At this intersection, Alternative VA would produce an increase in traffic volumes and would result in a maximum one-hour average CO concentration in excess of the state one-hour average standard of 20 ppm.

Alternative VI would have CO impacts similar to those of Alternative II except where vehicle queuing occurs at the Peninsula Commute Service extension crossings at Third, Fourth and Brannan Streets. No violations of air quality standards are predicted to occur.

Sensitive Receptors. The most air pollution-sensitive receptors are hospitals, nursing homes and schools. No such uses were identified in locations where the proposed project would result in an increase in air pollution. However; some receptors less sensitive than those listed above were identified. These include residences, hotels and public open spaces. Residences on King Street between Third and Fourth would be subjected to CO concentrations in excess of the state 1-hour air quality standard under Alternatives II and III. Users of Justin Herman Plaza would be subjected to a slight increase in CO levels compared to existing conditions under adverse meteorological conditions during the evening peak hour under Alternatives IV and V. Otherwise, concentrations at sensitive receptors would be less than existing concentrations.

Alternatives I, II and VI would result in improved air quality at Justin Herman Plaza and at residences near First/Harrison compared with the other alternatives. The CO air quality to which residents and pedestrians would be exposed on Broadway, however, would be better under Alternatives III, IV and V than under Alternatives I, II and VI. CO air quality at hotels on New Montgomery/Market and Kearny/Sutter would be slightly better under Alternatives III and IV.

Existing residential and recreational uses along the Embarcadero roadway include Golden Gateway Commons and Levi's Plaza. Planned uses include residences in the South Beach/Rincon Point Redevelopment Area between Bryant and King, and a park along the waterfront. These areas would be exposed to higher CO concentrations under Alternatives III, IV and V than I, II and VI. However, no violations of air quality standards are predicted to occur in these locations.

Consistency with the AQMP. The proposed project alternatives do not conflict with the transportation control measures contained in the 1982 Bay Area Air Quality Plan. Further, since overall VMT is predicted to decrease for Alternatives II-VI relative to Alternative I, these alternatives support the goals of the Plan. However, because of changes in the amount and location of traffic congestion, some locations would experience increased CO concentrations relative to Alternative I, and, in some cases, relative to existing air quality. As a result, each alternative contains some elements (e.g. new ramps to I-280, removal of the Embarcadero Freeway), which would impede progress toward achieving and maintaining compliance with CO air quality standards. It should be noted, however, that only the state one-hour average CO standard is predicted to be exceeded, whereas AQMP is directed toward compliance with the federal standards only (federal standards are listed in Tables V-17 and IV-21) and no federal standards are exceeded in any location for any alternative.

Regional Issues. Potential regional air quality impacts of the proposed project would be the result of changes in the number of vehicle miles traveled (VMT) by all modes of transit, the amount of traffic congestion and quantities of pollutants emitted. Based upon the traffic analysis, all of the alternatives would result in a reduced VMT and, thus, reduced emissions. The estimated changes are shown in Table V-18. Table V-18 shows that selection of any one of alternatives would result in improved regional air quality. The largest improvement would result from Alternative VA; however, even this reduction would not be expected to result in a measurable improvement in ozone air quality.

5. Noise and Vibration

a. Criteria for Evaluation

The following steps were used to analyze the noise impacts of the various alternatives. First, an area of impact was defined. Because traffic noise must increase or decrease by 3 decibels before there is a noticeable change in noise level, those streets expected to experience a change of three or more decibels defined the study area. All streets where rail or bus operations are proposed were also included in the study area. Second, noise-sensitive receptors were located and existing noise levels were determined.

The third step involved defining criteria against which the noise impacts of the various alternatives could be assessed. Criteria were established using input from members of the Transfer Concept Program Study's Technical Advisory Committee. It was determined

Table V-18

REDUCTIONS IN VEHICULAR POLLUTANTS COMPARED TO ALTERNATIVE I
(tons per day)

	II[1]	III	IV	IVA	V	VA	VI	Year 2000 Regional Total[2]
Carbon Monoxide	.022	.319	.348	.526	1.001	1.206	.476	2,250
Hydrocarbons	.000	(1.65)	(.163)	(.149)	(.064)	(.043)	(.103)	570
Nitrogen oxides	(.011)	(.881)	(.880)	(.876)	(.686)	(.672)	(.646)	610
Sulfur oxides	(.002)	(.133)	(.133)	(.133)	(.103)	(.100)	(.098)	240
Total Suspended	.002	.058	.058	.058	.134	.160	.051	640

[1] Numbers in parentheses indicate an increase compared with Alternative I. These increases are due to increased bus travel.

[2] Source: Association of Bay Area Governments, 1982 Bay Area Air Quality Plan, Draft for Public Review, Berkeley, California, July 1982 and Bay Area Air Quality Management District, 1979 Source Inventory, San Francisco, California, 1980.

that commercial and office uses would be evaluated using criteria developed by the U.S. Department of Transportation contained in Volume 7, Chapter 7, Section 3 of the Federal Aid Highway Program Manual. For these uses, the criterion is that during the noisiest hour of the day, the noise level should not exceed an Leq of 72 dBA. Residential, school, and other non-commercial noise-sensitive uses would be evaluated against the goals contained in the Environmental Protection Element of the San Francisco Comprehensive Plan. The City finds that residential land uses including hotels and motels are compatible with an exterior noise environment of up to an Ldn of 60 dBA with no special noise insulation requirements. This means that a minimum amount of interference with indoor activities would be expected even with windows open. Between 60 and 70 dBA, new construction or development should be undertaken only after detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Above an Ldn of 70 dBA, new construction or development should generally be discouraged.

Fourth, in conducting the noise impact analysis for the various alternatives, increases in ambient noise levels were rated as follows:

Decibel Increase	Impact
0-3	No adverse community response
3-6	Some impact (sporadic individual complaints)
6-10	Significant impact (widespread individual complaints)
10+	Very significant impact (wide-spread community annoyance)

b. Environmental Impacts

This section describes the potential noise impacts associated with the alternatives. To allow a direct comparison between the alternatives, year 2000 conditions under Alternative I, the "no-project" alternative, have been used as a baseline. Under Alternative I, noise levels would be expected to increase slightly over existing noise levels throughout the study area. Except in the vicinity of the SP Depot, traffic noise levels would increase by an insignificant amount; that is, the Leq would increase by less than 1 dBA during the noisiest hour.[24] In the vicinity of the SP Depot, noise levels along King Street between Fourth Street and the Embarcadero roadway are expected to increase by up to 3 dBA, a barely noticeable difference. Future noise levels on King Street would be expected to reach a noisiest hour Leq of about 65 dBA.

A detailed comparison of the other alternatives was done on a segment-by-segment basis (segments are shown in Figure III-1, page III-4).

<u>China Basin Segment</u>. In Alternative II traffic volume on King Street would increase, but the overall noise level would be expected to increase by less than 3 dBA. Traffic decreases along Berry Street would result in an insignificant reduction in noise levels. Alternative III would be similar to Alternative II, except that the light rail vehicles would generate maximum noise levels of approximately 71-75 dBA at a distance of 33 feet from the tracks (typical of the nearest existing building setbacks in the area). These levels are 5-10 decibels lower than noise levels generated by diesel buses. If vintage streetcars are used they would emit noise levels of 75-85 dBA at this distance. These vehicles would share the right-of-way with a number of other Muni vehicles (bus lines 27 and 42), many of which are diesel powered. Therefore the resulting noise level along Townsend Street in the China Basin segment would not differ measurably from the "no-project" condition.

The anticipated vibration levels in buildings along the route taken by the Muni Metro/E-Line tracks are calculated to be, at worst, "barely perceptible" for the LRVs, and "perceptible" for the streetcars. Both types of vehicles have resilient wheels but the LRVs are lighter and cause less ground vibration. Significant ground vibration impacts would not be expected along the routes evaluated.

Alternative IV would have impacts very similar to Alternative II. Alternative IVA would have the same impacts as Alternative IV except for slight noise increases along King and Berry Street as a result of reconfiguring the I-280 ramp system. Traffic noise levels of Alternatives V and VI would be similar to those of Alternative II.

Alternatives V and VI include the at-grade Peninsula Commute Service extension. The trains measured leaving the existing SP Depot emit engine noise levels of about 90 dBA at a distance of 25 feet. The train whistle, which must be sounded at each grade crossing, emits a level of up to 105 dBA at 100 feet. There would be a six-foot sound wall along the rail extension which would not, however, reduce noise levels from a slow-moving train. These trains are approximately 15 feet tall and represent a noise source much larger than the six-foot sound barrier. Although loud, the trains would be compatible with the industrial/warehouse development in the area. The noise of the trains, and particularly the whistle, would be high enough to interfere with the sleep of people in a RV park

located in the area. Trains would run from about 6:00 a.m. to 11:00 p.m. The effect of train noise on proposed residential and office uses in the Mission Bay area would depend upon the layout and design of these uses. Additional design mitigation measures could be required in these developments to offset noise generated by the trains. Electrified trains would significantly decrease train engine noise, but train whistle noise levels would remain unchanged.

In Alternative VA, because the Peninsula Commute Service trains would be underground east of Fourth Street, noise levels along King Street and particularly in the San Francisco Recreational Vehicle Park would be lower than under Alternative V. Noise levels along King Street would not be noticeably different than existing levels except for the occassional Belt Line trains that would pass closer to King Street than they presently do. Noise from Belt Line trains would occur in this and all other alternatives. However, the infrequent use of the Belt Line (approximately three times per week) railroad significantly lessens the impact of noise generated by trains on this line.

Although the Belt Line would operate infrequently in all alternatives, it could have an adverse impact on future housing in the China Basin and Rincon Point/South Beach segments if operations were to continue in early morning hours as they currently do. Therefore, if housing is developed in these segments, Belt Line operations should be rescheduled around peak traffic period during daylight hours.

South Beach/Rincon Hill Segment. For Alternative II the Embarcadero and other roadway improvements would result in a 1 dBA increase during the noisiest hour. In Alternative III, IV, and IVA, the Muni Metro extension/E-Line tracks would pass in front of potential housing sites in the area. The tracks would be closer to the site than the Embarcadero roadway. The resulting noisiest hour Leq would be 66 dBA, the same level that presently exists at a similar distance from the Embarcadero roadway. Maximum noise levels would remain the same as existing levels. The resulting noise environment would continue to be above the level considered desirable by the City of San Francisco for new residential development.

The only difference between Alternative III and Alternatives V and VI in this segment is that the Peninsula Commute Service is extended. It is estimated that there would be approximately 60 train trips per day along the extension. Noise levels on the redevelopment site would be significantly increased as a result of this extension. Noise

levels 50 feet from the tracks would reach an Ldn of 72 dBA. Noise levels this high are considered by the City of San Francisco to be undesirable for residential development. In fact, the City suggests that new construction or development in this noise environment should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. The implementation of the rail extension would have significant ramifications for housing design in this area. Of particular importance would be the noise generated by train whistles blown at the Brannan Street crossing in the middle of the South Beach Redevelopment Area. Mitigating the impact of train noise on future housing in the area would primarily be a matter of proper site planning and building construction. A combination of techniques including setbacks from the railroad, proper building orientation and exterior window/wall construction would be necessary to provide an acceptable interior noise environment.

For Alternative VA, noise levels in this segment would be significantly lower than for Alternative V as a result of placing the rail tracks underground. The elimination of train passby noise and the noise generated by the sounding of whistles at at-grade crossings would significantly reduce the noise control requirements for the proposed housing in the South Beach subarea of the Rincon Point/South Beach Redevelopment Area. Average noise levels would, however, remain high due to traffic on the Embarcadero roadway. The resulting noise levels in the redevelopment area would be as described for Alternatives III-IVA.

<u>Ferry Building Area Segment</u>. For Alternative II noise levels along the reconstructed Embarcadero roadway and other streets in this segment would increase by no more than 1 dBA during the noisiest hour. Impacts of Alternatives III-VA would be similar to one another. The biggest change in noise levels in this area would be along the portion of the Embarcadero roadway now under the freeway. In this area, the Leq would be expected to decrease between 5 and 8 dBA, depending on location, during the noisiest hour. Noise levels would decrease as a result of eliminating freeway traffic and the reverberant space created by the freeway. The noise environment would be significantly improved in such neighboring areas as Justin Herman Plaza, the Golden Gateway apartments, the Hyatt Regency and the Ferry Building. Noise levels on other streets in this segment and along the Embarcadero roadway south of the existing freeway structure would increase by less than 3 dBA. Alternative VI noise levels would be as described under Alternative II except

that an E-Line streetcar would be added instead of buses, resulting in slightly lower noise levels along this alignment.

Piers 9 through 35 Segment. For Alternative II hourly noise levels along the streets in this area would increase by less than 1 dBA. For all other alternatives the E-Line bus would be replaced with the shared E-Line/Belt Line along the Embarcadero roadway. Noise levels in this segment would not increase measurably as a result of this project.

Fisherman's Wharf Segment. For Alternative II, the major change in this segment would be along Jefferson and Beach Streets. The resulting change in noise levels would not be noticeable. The noise generated by the new E-Line buses would be at or below the present level generated by trucks and buses on these streets. For Alternatives III, IV, V, VA and VI the impacts would be the same as described for Alternative II, except that the E-Line would be routed down Leavenworth between Jefferson and Beach Streets. Alternative IVA, by closing Jefferson Street to through-traffic and restricting it to transit and local access uses, would result in an overall decrease in noise levels along Jefferson Street. This decrease is calculated to be approximately two dBA during the noisiest hour. The resulting noise level outside of the Anchorage and the Cannery would be an Leq of 55 to 60 dBA. Maximum noise levels would be 75-80 dBA. The noise of the LRVs would be compatible with the existing commercial development in this area.

Fort Mason/Aquatic Park Segment. For Alternative II, the E-Line bus route would run along Van Ness Avenue and North Point, Laguna, Bay and Beach Streets. Although the average noise level would not be expected to change noticeably (that is, less than a 3 decibel increase in the noisiest hour Leq), maximum noise levels along the section of Bay Street between Van Ness Avenue and Laguna Street might change as the buses would represent a new noise source in this area. If newer model buses are used, noise levels would be about the same as those generated by existing traffic. Older buses might increase maximum noise levels by 5 to 10 dBA above existing levels. Under these conditions, some complaints from the residents in this area might be expected.

For all other alternatives the E-Line between Hyde Street and the existing tunnel under Fort Mason would result in increased noise levels in Aquatic Park. The E-Line would have up to 16 trains an hour through the park on weekdays. The resulting maximum noise levels would range from over 75 dBA at a distance of 30 feet from the tracks to less than 60

dBA at remote points of the park. The noisiest hour Leq in the park at a distance of 50 feet from the tracks would be about 54 dBA. This is equivalent to the existing average noise level in the park. Noise levels during E-Line passbys could, however, interfere with conversation. Due to the relatively low volume of trains and corresponding equivalent noise level, it is not anticipated that this would be a significant noise impact.

In summary, the only anticipated significant noise impact would be in the Ferry Building segment under Alternatives III-VA, which include removal of the Embarcadero Freeway. Under these alternatives, a decrease in hourly noise levels of 5 to 8 dBA would be expected in the vicinity of the existing freeway structure. Noise levels in these areas would be reduced because the relatively high speed freeway traffic would be rerouted at lower speeds to surface roads (the noise reduction due to reduced speeds more than offsets the increased volume on the local surface streets); and the lid on the "reverberation chamber" created by the freeway structure and adjacent buildings would be eliminated. Minor impacts would be expected under Alternatives V and VI related to the Peninsula Commute Service extension. Finally, some minor activity interference in the Aquatic Park area would be expected during LRV passbys under Alternatives III through VI.

The vibration impacts associated with all of the alternatives were considered negligible. In locations where the proposed rail vehicles would operate through residential areas, the light-rail vehicles, buses, or conventional streetcars would generate vibration levels at or below existing vibration levels and in those areas where the railroad would be extended, the existing land uses are primarily industrial or office/commercial. Vibration impacts on future housing in the Mission Bay and South Beach/Rincon Hill areas would depend upon development plans.

6. Ecology

Implementation of Alternatives I and II would have little or no biological impacts. Alternative II proposes the redirection of traffic off the Embarcadero roadway onto Steuart Street between Howard and Harrison Streets. This action would open up a parcel of land between Steuart Street and the Bay for a planned new park. Consequently Alternative II has a positive biological impact.

Alternatives III-VA propose the removal of the Embarcadero Freeway from Beale Street to Broadway. This action would result in the removal of existing landscaping along the

freeway corridor during demolition of the freeway. This impact would be most significant at Embarcadero Plaza where the Washington Street off-ramp and the Clay Street on-ramp pass over the park. Table V-19 provides a list of plants used to landscape the park. It would be necessary to remove any of these plants located in the construction area during demolition of the freeway. The removal of existing plants would result in a short-term reduction in the wildlife habitat value of the park. Additional parkland created in two areas, however, would have a positive impact over the long-term life of the proposed project. Removal of the Washington Street off-ramp and Clay Street on-ramp would open this area up for additional landscaping and open space to complete the park setting now on the site. An additional park area would be created between Howard and Harrison Streets along the Bay as described in Alternative II above. The Catalina Ironwood tree near Folsom and Fremont Streets would also have to be removed or destroyed along with other eucalyptus trees immediately adjacent to the freeway. Since these trees are in a small landscaped setting, and the Catalina Ironwood is outside its native range, the loss of these trees would not be considered a significant loss of wildlife habitat or of a rare native species.

For those impacts associated with the removal of the Embarcadero Freeway (Alternatives III-VA) the following mitigation measures should be adopted to reduce the biological impacts to an insignificant level: replant disturbed areas in Embarcadero Plaza with plant species which produce winter fruit for birds; replant with evergreen trees and brush to provide nesting habitat and cover; install bird feeders and baths;[25] and, during construction activity, store large equipment away from trees so as to avoid compacting the soil and reducing the health of the trees. In general, the landscaped park appearance and habitat that now exists on the site should be retained after project completion.

Alternatives IV and IVA propose new on- and off-ramps and the removal of a portion of the existing I-280 Freeway which now extends over the China Basin channel. Existing structural pillars and footings would be removed from within the channel and replaced with new pillars and footings for the proposed new on- and off-ramps. During construction activity bottom sediments would be stirred up, adding to suspended materials in the water. In addition, debris and dust would fall into the water and intertidal zones, thus contributing to the sediment levels in the water and possibly reducing the depth of the channel. During the curing process of poured concrete, toxic lye may be leached out if it is in contact with salt water. These impacts could reduce the spawning habitat of the

Table V-19

PLANT SPECIES IDENTIFIED IN AND AROUND EMBARCADERO PLAZA

Scientific Name	Common Name	Approximate Number Identified
Arbutus unedo	Strawberry Tree	18
Eucalyptus sp.	Gum Tree	21
Ficus retusa nitida	Indian Laurel Fig	28
Hedera helix	English Ivy	--
Pinus sp.	Pine Tree	16
Platanus acerifolia	London Plane Tree	42
Prunus sp.	Plum tree	14
Populus nigra 'Italica'	Lombardy Poplar	90
Salix babylonica	Weeping Willow	4
Ulmus parvifolia	Chinese Elm	12
Hebe sp.	Hebe	--

Pacific Herring, an economically valuable fisheries resource, at the mouth of the channel. Any nesting birds under the freeway would be displaced and if construction were to occur during breeding activity young may be killed as well. These or other birds may use the new structures as nesting sites.

Alternatives V, VA and VI propose to add a three-track trestle section over the China Basin channel at its west end underneath the existing freeway. This proposal would require placing pylons and footings in the channel to support the trestle. This activity could increase the sedimentation levels in the water and reduce herring habitat if the sediments are transferred to the mouth of the channel. If designed properly, these footings may actually create a habitat for aquatic organisms. However, without improvement of the existing water quality in the channel this new habitat would also be degraded in a short time.

Impacts in the China Basin channel associated with proposed activities in Alternatives IV through VI may be mitigated through the following activities in consultation with the California Department of Fish and Game: minimize construction activities which contribute to siltation and debris in the channel; limit any construction activity in the channel during the Pacific Herring spawning season (mid-November through March and during bird breeding season); place temporary dikes around any poured concrete in the channel to prevent toxic lye from leaching out into the water during curing of the concrete; remove all temporary structures and materials from the area after construction; and use large rocks around the pillar footings to provide habitat for aquatic organisms.

In summary, Alternatives II through VI would potentially have long-term positive impacts on parkland areas. Alternatives II, IV and V would each result in two added open spaces in the Ferry Building segment of the study area. In addition, Alternatives IV and V, as well as Alternative VI if properly designed, could create additional wildlife habitat in the China Basin channel. Alternatives II through VI would create additional parkland in the Embarcadero area between Harrison and Howard Streets. Alternative I would result in little or no impacts, positive or negative.

E. GROWTH-INDUCING IMPACTS

The Embarcadero Corridor passes through the South of Market, Downtown and Fisherman's Wharf areas of San Francisco. These areas have been extensively developed with commercial, office, light industrial and residential uses. Though highly developed, portions of these areas, especially in the downtown and South of Market areas, are expected to experience extensive development in the future. This development will primarily be in the form of redevelopment with more intensive uses. As discussed in Chapter IV, Environmental Setting, a net increase of up to 21,000 housing units could be developed in the project area by the year 2000 and employment could increase by over 104,000 jobs in the City of San Francisco.

The I-280 Transfer Concept Program would tend to accommodate and influence the location of future development in the northeast portion of San Francisco rather than to significantly induce growth. Businesses and households, when deciding where to locate, consider a number of factors, one of which is transportation access. Transit access improvements associated with the project may have a small impact on total growth in northeastern San Francisco. The potential impact of the project is overshadowed by such factors as the value of land in San Francisco versus the remainder of the region and the capacity of highways and bridges serving commuters.

More importantly, though, could be the influence of the I-280 Transfer Concept Program alternatives on the location of development. Improvements in the South Beach/Rincon Hill and China Basin segments could encourage development in these areas and in the Mission Bay area. Removal of the Embarcadero Freeway (Alternatives III-VA) could have a small adverse impact on growth in the downtown area north of Market Street and tourist business in the Fisherman's Wharf area. This would apply primarily to Alternatives III and IV, which remove the Embarcadero Freeway and do not include new on- and off-ramps connecting the Embarcadero roadway to I-280. Adverse impacts on Fisherman's Wharf area businesses would be offset by improved transit access from downtown via the E-Line.

In addition, the transit/pedestrian mall proposed for the Fisherman's Wharf segment in Alternative IVA could increase the attractiveness of that area, thus enhancing sales. The potential extent of increased sales resulting from this mall is immeasurable. Removal of the Embarcadero Freeway (Alternatives III-VA) and a portion of the I-280 Freeway (Alternatives IV and IVA) could enhance development in those areas by improving visual

quality, reducing noise and freeing land for development. Also, high density development could be encouraged to locate in the immediate vicinity of major transit stops (e.g. the new downtown Peninsula Commute Service depot).

All of these potential impacts on the distribution of development in northeast San Francisco are consistent with City policies as stated in the Northeastern Waterfront Plan, and proposed policies as stated in the Downtown Plan. Most important are policies in the Downtown Plan that shift the emphasis on future development toward the South of Market area.

However, the at-grade Peninsula Commute Service extension (Alternatives V and VI) could have growth impacts contrary to City policy. The at-grade portion could have an adverse impact on proposed residential uses in the South Beach portion of the Rincon Point/South Beach Redevelopment Area.

The various alternatives would result in minimal employment increases; no alternative would increase direct and indirect employment levels by more than 200 jobs.

F. CONSTRUCTION IMPACTS AND MITIGATION

Construction activity associated with the I-280 Transfer Concept Program alternatives would produce varying degrees of short-term inconvenience and disruption of local activities. Inconveniences would generally take the form of temporary restrictions of access, temporary land use changes, traffic delays, rerouting of transit service and pedestrians, and impacts on nearby areas from noise and dust generation. The construction impacts analysis focuses on impacts associated with Alternatives II through VI. Alternative I, the No Project Alternative, is not analyzed in detail because it involves already approved TSM projects which would have minimal construction impacts. Displacement and construction cost impacts are discussed respectively in Sections V.B.1.a and V.B.2 of this report.

1. Construction Process and Schedule

Most construction activity associated with the alternatives would occur in existing public rights-of-way. Exceptions include construction activity associated with the Embarcadero surface road realignment between Howard and Harrison Streets (Alternatives II-IV), the Muni Metro turnaround located beneath Justin Herman Plaza (Alternatives IV and IVA), the E-Line terminus in Fort Mason (Alternatives IVA and VA), the Brannan Street extension (Alternatives II-VI, excluding IVA), and the Peninsula Commute Service extension downtown station (Alternatives V-VI).

The major construction activities include ramp construction, freeway demolition, roadway and parking lot construction, and underground and at-grade railway construction. Most of these involve standard construction procedures. These include the underground railway work combining soldier pile and lagging cut-and-cover, and slurry wall construction procedures; and the freeway demolition, which would use a crane and steel wrecking ball.

For Alternatives III-VA during demolition of the Embarcadero Freeway traffic along the Embarcadero surface roadway adjacent to the part of the viaduct being demolished would be restricted to provide working space and waiting areas for dump trucks. Demolition of spans over intersections and cross streets would require traffic diversion during work hours. At other times traffic could be maintained. No one intersection or street would be interrupted during demolition for more than five or six days. Structures adjacent to the freeway would be protected by falsework or chain link fencing fabric or other means. Victoria Station restaurant located beneath the Broadway off-ramp and structures along

the Embarcadero roadway between Mission and Howard (such as the YMCA and Audiffred Building) would require special precautions.

Reconstruction of the Embarcadero surface road and associated street improvements would take up to three years. Construction would occur in segments so that two or three lanes of the Embarcadero roadway would remain open to through traffic. Short-term closures of individual intersections may be required. I-280 and Embarcadero Freeway touch-down ramps would each require approximately 12 to 15 months to construct, with work proceeding concurrently for several ramps.

The Muni Metro and Peninsula Commute Service extensions and the E-Line involve three types of construction: underground, at-grade, and transition sections between underground and at-grade. Underground construction would involve either of two construction methods: soldier-pile and lagging cut-and-cover with temporary wooden decking in a 240 foot section under Market Street from the Muni Embarcadero Station towards the Ferry Building; and slurry walls with temporary wooden decking in a 700 foot section under Steuart Street between Market and Mission. Slurry walls would also be used in the sensitive construction area (about 240 feet long) in the vicinity of the existing BART tubes at the foot of Market Street. Both categories of underground construction generally involve working one-half of the corridor width at a time so as to permit some traffic flow at all times. Each section is excavated and a temporary wooden decking installed to enable surface conditions to be as normal as possible while the underground work is carried out.

The at-grade construction process generally involves temporary restrictions on traffic and/or parking lanes in the area adjacent to the trackage. Work includes opening up a segment of the roadway and disposing of the excavated material, temporary or permanent relocation or support of underground utilities, placement and compaction of subgrade material, installation of ballast and ties (or pouring of concrete slabs with direct fixation of tracks, if required), tamping of ballast (or backfilling of material over slab) and restoration of pavement. Construction is expected to proceed one block or so at a time in various places along the line. This would reduce the impact in any one neighborhood during a given period, with about three to four months of major activity at each location. At most sites it should be possible to maintain local access for most, if not all, portions of the day, with through traffic directed to other facilities wherever possible or restricted to

a reduced number of through lanes. It should also be possible at critical locations and key intersections to restrict construction operations during peak traffic hours, with most work occurring at off-peak hours or at night where appropriate and necessary.

Some elements (such as the surface roadway under the Embarcadero Freeway) would require completion of other elements (demolition of the Embarcadero Freeway) prior to their construction, which would lengthen the overall construction schedule. The most complex construction schedules are for alternatives that include removal of the Embarcadero Freeway, since complete or partial demolition of the Freeway must occur before other activity can occur.

Preliminary construction schedules have been developed for each alternative and are included in Working Paper 2.2.9, Construction. Alternative II involves the least amount of construction over the shortest period of time (34 months). Construction periods for other alternatives range between 38 and 42 months. All alternatives involve periods of simultaneous construction for all elements. The most overlap occurs during the first 12 to 18 months of construction, after which overall construction activity decreases as individual elements are completed. This approach was originally developed to comply with the need for having all elements under construction by September, 1986. This requirement was subsequently eased under the terms of the Surface Transportation Act of 1982. A variety of approaches to construction scheduling are possible, including providing for as many mitigatory measures as possible before demolition of the Embarcadero Freeway, if that option is selected for implementation. The present schedules are adequate for the evaluation purposes of this report but a more refined construction schedule will have to be developed as part of preliminary engineering work, should one of the "build" alternatives be selected for implementation.

2. Noise and Vibration

The potential noise impacts of construction activities on adjacent land uses would vary according to the distance between the affected receiver of the noise and the noise source. In general, the extent of construction noise impacts correlates to the duration and complexity of each alternative's construction schedule. Though no one area will be exposed to continuous nearby construction noise for a long period of time, individual areas could be exposed to noise several times for relatively short periods over the 3-4 year overall construction period. Those alternatives which involve construction of the most

elements would have more noise impacts not because of the maximum noise levels generated, but because of the duration which individual areas would be exposed to noticeable noise levels. The segment most affected by construction noise would be the Ferry Building segment in those alternatives that include removal of the Embarcadero Freeway (Alternatives III-VA). A more detailed discussion of construction noise impacts on a segment-by-segment basis is presented below.

This section describes the anticipated "worst-case" impacts of construction noise on the land uses in each segment of the project for the different alternatives. Because construction noise is of a relatively temporary nature, standards adopted to control construction noise emissions are higher than allowed for permanent noise sources. In general, the standards are designed to protect against significant activity interference (e.g., interference with sleep disturbances and speech). The typical maximum noise levels of construction equipment is presented in Table V-20.

Any project undertaken in the City of San Francisco must meet the requirements of the San Francisco Noise Ordinance (Ordinance 274-72, Regulation of Noise, Section 2907). The ordinance requires that all powered construction equipment, except impact tools and equipment, emit not more than 80 dBA measured at 100 feet. Impact tools and equipment including pavement breakers, jackhammers, and pile drivers must have both intake and exhaust muffled to the satisfaction of the Director of Public Works. The ordinance further requires a special permit for construction after 8:00 p.m. and before 7:00 a.m. As can be seen from evaluating the noise emission levels of typical equipment shown in Table V-20, noise levels of some of the equipment anticipated to be used on the job could be expected to exceed the limits of the San Francisco Noise Ordinance. In general, these violations would not be significant.

a. China Basin Segment

The China Basin office building, the San Francisco recreational vehicle park and commercial uses along Townsend Street would be most affected by construction-related noise impacts in this segment. During the majority of the construction under Alternative II, noise levels in the China Basin office building, even with the windows in the building open, would not cause a significant impact. With the windows open, some speech interference could be expected and some people might be annoyed and distracted. With the windows closed, interference would be minimal. During construction on Third and

Table V-20

CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Typical Maximum Sound Level at 50' (DBA)	Construction Activity: Street Reconstruction	Ramp Construction	Freeway Demolition	Rail Extension	Muni Turnaround
Pile Drive	105		X			
Spike Driver	90				X	
AC Paver	89	X			X	
Pavement Breaker	88	X	X		X	X
Diesel Pile Driver	88					X
Diesel Crane	88		X	X		X
Bulldozer	86[1]			X	X	X
Jackhammer	85	X	X	X		
Loader and Backhoe Combination	85[1]	X	X		X	
Grader	85	X			X	
Skip Loader	85		X			
Concrete Pump Truck	85		X		X	X
Front End Loader	85[1]			X		
Truck-Mounted Diesel Ballast Tamper	85				X	
Backhoe	85					X
Trucks	83			X	X	X
Roller for Compaction	80	X			X	X
Slurry Pumps	80					X
Power Saw	78		X			X
Air Compressor	75	X	X	X		

[1] 96 DBA for back-up beeper

Fourth Streets near the building, noise levels even with the windows closed would interfere with speech and annoy and distract workers. This would occur about a month or less for each end of the building.

The San Francisco RV park would be exposed to noise generated primarily by the reconstruction of King Street. Noise levels would be high enough to cause sleep disturbance and/or annoyance. Daytime construction noise, however, would not have a negative impact as the park is primarily used at night. As long as the construction does not take place at night, no impact would be expected. This applies to all potential construction noise impacts on the RV park for all alternatives. The RV park is considered to be an interim use. If a development proposal in the Mission Bay area were to be pursued, the RV park site would be redeveloped. Therefore, there may not be any impact on the RV park as a result of the project.

In Alternative III construction noise impacts would be the same as Alternative II with the addition of noise generated by the Muni Metro and E-Line extensions along Townsend and King Streets, and the removal of the I-280 Freeway stub. During rail line construction sound levels in commercial uses along Townsend Street would be expected to interfere with conversation and telephone use and would be annoying and distracting. This impact would last two to three weeks at each location. In the China Basin building demolition of the I-280 stub would be annoying and cause occasional speech interference.

Alternatives IV and IVA would have impacts similar to Alternative III. Construction of the new on-ramps for these alternatives would have no significant impact on adjacent uses. Under these alternatives commercial uses along Townsend Street would not be impacted because the Muni Metro and E-Line extension lines are located along King Street. Impacts of Alternatives V, VA and VI would be similar to Alternative II, although they include the Peninsula Commute Service and Muni Metro extensions, because they would occur in the same location and use the same type of equipment as the road reconstruction. However, noise impacts for these alternatives would last longer as a result of the more extensive construction activity. Of these three alternatives, Alternative VA would require the longest construction period.

b. South Beach/Rincon Hill Segment

This area is presently used for manufacturing and warehousing and the resulting construction noise levels for any of the alternatives would not be anticipated to generate any adverse impacts. However, there are several long-term proposals to develop housing in this area; such housing would be adversely affected if it were completed prior to construction of the selected Transfer Concept Program alternative. Neither a firm schedule nor specific plans have yet been developed for the proposed housing. However, using worst-case assumptions that the nearest housing units would be located approximately 15 feet from the right-of-way along the Embarcadero roadway and that the units would rely on open windows for ventilation, it could be concluded that the impact on residents would range from significant (a level where relaxed conversation would be impossible) to no impact in units further from construction activity.

c. Ferry Building Area Segment

Noise-sensitive receptors in this segment include office, commercial and residential uses along the Embarcadero surface road. For those alternatives that retain the Embarcadero Freeway (II, VI), construction noise levels at the nearest sensitive development (Golden Gateway Commons) and the offices in the Ferry Building would be elevated approximately 5 dBA above those listed in Table V-21 because of the reverberation created by the elevated Embarcadero Freeway.

For Alternative II, the noise level in the nearest Golden Gateway Commons units would be expected to cause some annoyance and speech interference during the time construction is taking place directly outside. Noise levels inside the Ferry Building and the adjacent offices facing the Embarcadero roadway would reach an Leq of 73 dBA with the windows open and 68 dBA with windows closed. With the windows open, office workers would find it difficult to concentrate, relaxed conversation would be impossible, and telephone conversations difficult. With the windows closed, noise levels would be only somewhat improved. These worst-case levels would last for a relatively short period of time, on the order of several weeks, when the construction was directly outside of an office. As construction proceeded up the street, noise levels and their impacts would decrease significantly.

For the other alternatives, the construction noise impacts would be as described for Alternative II with the addition of noise generated by removal of the Embarcadero

Freeway, construction of the E-Line tracks, the F-Line extension, and the Muni Metro station. Extension of the E-Line and F-Line tracks and in particular construction of the Muni Metro station will affect existing land uses along Steuart Street and along the Embarcadero. Noise levels inside the newer office buildings with fixed windows, while potentially annoying, would not interfere with speech. Noise levels inside older office buildings would be high enough to interfere with speech during the noisiest activities. These highest sound levels would occur occasionally during the approximately 12 to 18 months it takes to prepare the underground portion of the subway station. After the temporary wooden decking is installed, the sound levels would be considerably lower.

For Alternatives III-VA, demolition of the freeway would create the highest noise levels in this segment. Inside the nearest Golden Gateway condominiums and the Victoria Station restaurant with the windows closed, noise levels would reach an Leq of 80 dBA. This is because at the closest point, construction would be directly outside these buildings. The resulting levels inside would be high enough to render these buildings unusable for their intended purpose. These levels would be reached for a week at the most. Noise levels inside office buildings and in the other residential areas would be as described for Alternative II.

Demolition of the Embarcadero Freeway could result in some noticeable vibration, particularly in the buildings along the Embarcadero roadway between Mission and Howard Streets. However, based on the analysis described in Appendix D (Embarcadero Freeway Demolition), the resulting levels would not be expected to cause any structural damage. No damage would be expected on buildings further from the freeway structure.

In Alternatives V and VI construction of the Peninsula Commute Service terminal in Rincon Annex would not be expected to adversely impact activity in nearby uses.

d. Piers 9 through 35 Segment

Construction in this area would consist of reconstruction of the Embarcadero roadway and construction of the E-Line. Both these construction processes would generate similar noise levels; therefore, the only difference between alternatives would be the duration of construction noise. Alternatives III-VI include the E-Line and would require a longer construction period than Alternative II. Construction noise would be expected to be occasionally annoying and interfere with speech when construction is nearest a given

building. This would be expected to last at most for several weeks. During the rest of the time, construction noise would at the worst be annoying.

e. Fisherman's Wharf/Fort Mason and Aquatic Park Segments

For all alternatives, noise impacts during construction in these segments are expected to be minimal, although they could occasionally be annoying to some tenants. Noise levels inside commercial uses in the area could reach 53 dBA, which would not be expected to interfere with commercial activities. Activities in Fort Mason and Aquatic Park would not be expected to be disrupted by construction noise.

3. Vehicle and Pedestrian Access

Disruption of vehicular and pedestrian access during construction, as well as being an inconvenience for residents, can adversely affect businesses if inadequate access is provided during construction. For this reason, a primary objective during construction is to maintain maximum vehicle and pedestrian access to all existing businesses and residences. Businesses such as restaurants and retail stores are particularly sensitive to disruption of pedestrian access. Disruption of a community's normal activities as a result of limited access is further compounded by other construction-related activity such as noise and dust generation.

Businesses that would be significantly impacted during construction are scattered throughout the Embarcadero Corridor with a concentration in the Fisherman's Wharf area. These are primarily restaurants located along the Embarcadero surface road and a combination of restaurants, retail stores, hotels, and other tourist-oriented uses in the Fisherman's Wharf/Fort Mason area. Other sensitive areas include public open spaces along the Corridor such as Aquatic Park, Levi's Plaza and Justin Herman Plaza. In general, the extent of disruption during construction would relate directly with the amount and duration of construction. The use of the Embarcadero Corridor as an important city transportation corridor used by commuters, local residents, tourists and delivery vehicles would compound the impacts of construction.

Construction activities would decrease the efficiency of traffic flows in the Corridor. Traffic would be more congested and would have to be detoured to other routes that would not normally handle large traffic volumes. Though traffic detour schemes and provision for access to adjacent properties could minimize impacts on the community,

construction activity would have some unavoidable impacts on the Corridor's circulation network. Following is a more detailed analysis of anticipated impacts for each alternative.

Alternative II involves the least amount of construction activity over the shortest period of time. The major activity affecting circulation would be the reconstruction of the Embarcadero surface roadway over a 2½ year period. Procedures such as working on only portions of the roadway at any one time and maintaining at least two lanes of through traffic on those portions being reconstructed would reduce impacts on traffic circulation. Each portion of the roadway would take 1 to 2 months to complete. For all the alternatives, freeway improvements would not require closure, allowing full or partial access at all times. Only short-term minor detours would be required for TSM improvements, street and ramp modifications and the intercept parking lots. A relative advantage of this alternative is that the Embarcadero Freeway would remain open. Thus automobiles and trucks that currently use this facility would be minimally affected by construction. Also, to some extent, the Embarcadero Freeway could be used as a detour route during construction in the Ferry Building and Piers 9-35 segments.

Alternative II would have the least impact on existing businesses. It involves the least amount of construction activity in the area with the largest concentration of retail stores, restaurants, and pedestrian activity (i.e., Fisherman's Wharf/Fort Mason). The Ferry Building area, which has a high volume of pedestrian activity, would experience the least construction impacts under this alternative.

Alternatives III through VA have very similar impacts and would have greater construction impacts than the other alternatives. Even with careful construction scheduling, access to and through the area would be significantly affected by construction, especially since the Embarcadero Freeway would be closed early in the construction process, and road and transit improvements designed to offset this loss would not be fully completed until the end of the construction process.

Impacts on traffic circulation beyond those of Alternative II include the following. First, during demolition of the Embarcadero Freeway and upgrading of the touch-down ramps, traffic would be detoured from the area for up to 2½ years. For Alternative III this impact would occur over a shorter period because less construction activity would occur.

Second, construction activity would occur for a longer period along the Embarcadero roadway because of the installation of the fixed rail lines for the Muni E-Line and Muni extension. Along the Embarcadero roadway, disruption of traffic would not be as extensive during this activity as for the roadway reconstruction because construction would be primarily in the median. However, traffic would be disrupted by construction of intersection crossings and maintaining access for construction vehicles. Third, demolition of portions of the I-280 Freeway in Alternatives III, IV and IVA could require detouring traffic for several months.

Fourth, in the Fisherman's Wharf/Fort Mason areas, construction of the Muni E-Line could significantly affect vehicular and pedestrian access. Though some form of access would be available to all areas, there would be inconveniences, and revenues could be expected to decrease during construction activity. This impact would be mitigated by constructing the rail line in segments so that individual businesses would only be affected for a relatively short period. However, general access to the area would be affected for 2 to 2½ years. Fifth, certain areas along the corridor would be disrupted by construction activity several times during the overall 3½-year construction period as construction on different elements occur. This applies especially to the Ferry Building area.

Sixth, in the Ferry Building area, inconvenient access and construction-related noise and dust could significantly curtail pedestrian activity. This could reduce revenues for businesses in the area such as restaurants that depend on pedestrian access. Two areas that would have access severely limited during demolition of the Embarcadero Freeway are the Victoria Station restaurant, located under the Broadway exit, and the buildings adjacent to the freeway between Mission and Howard Streets. Also, street artists located in Justin Herman Plaza could be adversely affected during construction. However, access to Justin Herman Plaza could be maintained during all construction activity thus allowing street artists to operate in the plaza, although relocation within the plaza may be required. For Alternatives V and VA construction activity would be further intensified in the South of Market area by construction of the Peninsula Commute Service extension.

Construction of a Muni Metro station and transition structure would require intensive construction activity along Steuart Street between Mission and Folsom Streets. A number of shops and offices are located along the eastern side of Steuart between Mission and Howard Streets. Most structures here have pedestrian access off of either Mission Street

or the Embarcadero roadway. However, minimally, pedestrian access should be maintained during construction along the eastern side of Steuart Street. This should be possible because the Muni Metro station will be built in the middle of the right-of-way.

Impacts on vehicular and pedestrian access for Alternative VI would be greater than Alternative II impacts and less than those for Alternatives III through VA. The significant difference between this alternative and Alternative V is that the Embarcadero Freeway would not be demolished. Therefore, construction processes would not be as extensive in the Ferry Building area and construction of different elements would not overlap as much. Though construction activity would occur over the same time frame as Alternative V, impacts on circulation would be less severe since there would be less construction activity at any one time and the Embarcadero Freeway would remain open for traffic. This difference would be concentrated in the Ferry Building area. For this alternative, construction activities in the other segments would be almost identical to those for Alternative V.

4. Water Quality/Hydrology

Overall construction impacts on water quality and hydrology are expected to be minimal regardless of which alternative is selected. The most common impact would be the introduction of sediment from excavation and demolition activities into the storm/sewer system. Entry of sediment into the storm/sewer system would have minimal water quality impacts because the City has a "closed" sewer system: sediment is usually deposited in the sewer pipe, carried as bed load or suspended load, and collected in the siltation basin at the treatment plant. As a result, additional maintenance work to clean storm drains and siltation basins could be required during construction. The amount of additional maintenance would depend on the extent and effectiveness of mitigation measures used to reduce material introduced into the storm/sewer system.

Though this impact would not be significant for any alternative, the relative impact of each alternative would depend on the amount of excavation and demolition activity. Alternatives I and II would have negligible impact, while Alternatives III, IV, IVA, V and VA would have greater impacts because they all include demolition of the Embarcadero Freeway, resurfacing the Embarcadero surface road and railway improvements. Alternative VA would have the greatest impacts because it involves the most excavation work. Alternative VI would have somewhat smaller impacts than Alternative V because it does not include removal of the Embarcadero Freeway.

Another concern during construction would be providing adequate shoring and internal dewatering during major excavation for the Muni Metro and Peninsula Commute Service extensions. The deep excavation and dewatering could cause some subsidence and drawdown of the water table outside the excavation as is generally experienced on most major excavations in this area. The magnitude of impacts from this deep excavation would depend upon the shoring and dewatering methods as well as the distance to and type of foundations on adjacent buildings. Each alternative has at least one of these elements. Proper design features and construction precautions would minimize these impacts.

5. Air Quality

In general, demolition, site preparation activities, and the action of wind over exposed earth surfaces would negatively affect local air quality. Although some of this material would settle out of the atmosphere within the confines of the construction sites, a significant amount could be carried by local winds into adjacent areas. Violations of the state's 24-hour average standard governing total suspended particulates (TSP) might occur under adverse conditions. Irritation of individuals with respiratory problems could result.

Increased motor vehicle emissions due to increased traffic congestion caused by construction activities would also have an impact. In circumstances where traffic flow is impeded, additional idling, acceleration and deceleration would result which would increase vehicular emissions. Since traffic volumes in some areas are already high and CO air quality standards are currently being approached or exceeded at some locations, violations of CO air quality standards could result during construction. Violations of other air quality standards would not be expected as a result of increased traffic congestion. Exhaust emitted by construction vehicles and machinery would contribute to the overall burden of pollutants in the atmosphere. By themselves, these quantities would not be significant, but they would contribute to the cumulative air quality impacts of construction.

In Alternative II, the worst locations of air quality impacts would be in the vicinity of the Embarcadero surface roadway where, under some wind conditions, pollution would impinge upon heavily used portions of the downtown. Similarly, dust and traffic congestion would result at other construction sites. Alternative III involves significant demolition and construction activity along the Embarcadero Corridor, particularly from Beale Street to Broadway, which would generate dust and cause traffic congestion. These impacts are

likely to be more severe than the corresponding impacts of Alternative II because of the additional Embarcadero Freeway demolition work and the diversion of freeway traffic. Alternative III would produce greater impacts than those of Alternative II due to construction work for the I-280 touch-down, the E-Line railway and the intercept parking garage. Alternatives IV and VA would have similar air quality impacts as Alternative III except that air quality impacts would be more significant in the I-280 touch-down area because of the demolition of I-280 between Sixth and Third Streets. Alternative V would produce impacts similar to those of Alternative IV with the addition of the construction of the Peninsula Commute Service extension causing dust and increased vehicular emissions due to traffic congestion along its corridor. Alternative VI would cause less severe impacts in the Embarcadero Freeway Corridor than Alternatives III, IV, or V because of the absence of freeway demolition activity. Otherwise impacts would be similar to those of Alternative V.

6. Ecology

Both direct and indirect impacts on local vegetation and wildlife could occur as a result of construction activity. The direct impact would be the removal of planted trees and shrubs to allow construction activity. This would occur primarily around Justin Herman and Maritime Plazas in those alternatives that include demolition of the Embarcadero Freeway (Alternatives III-VA). This does not represent a significant impact because no endangered species would be affected and vegetation could be replanted after construction is completed.

Indirect construction impacts include negatively affecting the physical habitat of vegetation and wildlife. Primarily this involves polluting local air and water resources. A specific concern would be the polluting of China Basin, especially during the herring spawning season. Types of water pollution could include increased sedimentation levels and/or the leaching of toxic lye from concrete into water. This would be a special concern during construction of bridges over China Basin (Alternatives IV-VI). To reduce these impacts, mitigation measures that would minimize air and water quality degradation would be appropriate.

7. Solid Waste

Solid waste would primarily be generated by two construction processes, demolition of all of, or portions of, the Embarcadero and I-280 Freeways, and excavation for below-grade segments of the Muni Metro and Peninsula Commute Service extensions. Three areas have been identified in the East Bay (Richmond Dump, Berkeley Land Fill, Union City Turk Street Dump) that would accept the solid waste for a fee. The amount of construction-related solid waste is summarized for each alternative in Table V-21. An unspecified amount of excavation material could be retained in temporary storage areas and reused later in the construction process for backfill material.

Removal of solid waste would increase truck traffic in the project area. As shown in Table V-21, depending on the alternative, between 9,600 and 117,000 truckloads of material would be removed. These trips would be generated over much of the construction period, thus minimizing impacts on local traffic volumes and street system service levels. It is anticipated that during demolition and excavation, fewer than 400 truck trips per day would be generated. This represents a small percentage increase of local traffic volumes, and most trips would be to sites near the freeway network, thus minimizing impacts on the street network. A more significant impact from removal of waste material would be noise and potential dust generation along the routes of dump trucks, and interruption of traffic circulation at pickup sites.

8. Energy

Energy would be used for construction in the form of electricity, diesel fuel, gasoline and natural gas. The construction energy cost of each alternative has been estimated based upon the dollar cost of construction using energy per dollar figures for various types of construction.[26] The estimates of construction energy for Alternatives I-VI are presented in Table V-22.

In order to provide an indication of the relationship between the energy cost of construction and the amount of energy saved due to construction, Table V-23 was prepared. The table shows that Alternative II produces a net increase in energy use and therefore would not "pay back" its energy cost of construction. The remaining alternatives would result in pay-back periods ranging from 170 to 300 years based upon a comparison of each alternative with Alternative I.

Table V-21

SOLID WASTE GENERATION

(in cubic yards)

Alternative	Freeway[1] Removal	Excavation[2,3]	Cubic Yards	Estimated Truck Loads[4]
II	12,000	65,000	77,000	9,625
III	150,000	84,000	2304000	29,250
IV	236,000	101,000	237,000	42;125
IVA	236,000	101,000	337,000	42,125
V	142,000	359,000	501,000	62,625
VA	142,000	794,000	936,000	117,000
VI	12,000	299,000	311,000	38,875

[1] Assumes a 100% swell factor.

[2] Alternatives V and VI include 230,000 cubic yards (cy) of excavation material for the PCS extension.

[3] Alternative VA includes 665,000 cy of excavation material for the PCS extension to Transbay Terminal.

[4] Assumes average truck capacity of 8 cy.

The figures contained in Table V-23 for construction pay-back are based in part on estimates of energy assumption per dollar of construction reported by Caltrans.[27] It is noteworthy that these figures are about twice as high as comparable figures published elsewhere.[28] If the smaller figures were used, the pay-back periods reported in Table V-23 would be about half as large.

Table V-22

CONSTRUCTION ENERGY REQUIREMENTS FOR ALTERNATIVES I-VI

	Btu x 10^9	Equivalent Barrels of Oil
I	2.4	430
II	3,100	368,000
III	4,700	840,000
IV	5,400	971,000
IVA	5,300	960,000
V	10,000	1,850,000
VA	14,200	2,500,000
VI	9,200	1,700,000

Note: Based upon energy use per dollar figures contained in California Department of Transportation Laboratory, Division of Construction, Energy and Transportation Systems, Project 20-7, Task 8, Sacramento, California, December 1978. Since no energy per dollar estimates were available for demolition it was taken as half the value given for equivalent construction. Embodied energy and energy of manufacture are not included.

9. Mitigation

Mitigation measures could be used to minimize the negative impacts of construction. Unless noted otherwise, these mitigation measures would be applicable to any alternative. The importance of implementing a comprehensive set of mitigation measures increases as the extensiveness and complexity of an alternative's construction activity increases (notably Alternatives III-VA).

a. Process and Schedule

Demolition and construction procedures and equipment would be determined by the contractor and would be subject to appropriate agency reviews and approvals. There are several possible alternative procedures, including construction activity during off-peak travel times (e.g., early mornings and evenings), which would minimize impacts on traffic circulation. However, construction during off-peak periods is usually more costly and can disrupt residential neighborhoods. Early morning or evening demolition of the northern

Table V-23

ENERGY PAY BACK PERIOD

	I	II	III	IV	IVA	V	VA	VI
Construction Energy Compared to Alternative I (Millions of Barrels of Oil)	--	.37	.84	.97	.96	1.9	2.5	1.7
Annual Operational Energy Saved Compared to Alternative I (Barrels of Oil)	--	(980)	1,600	2,100	5,500	8,900	11,800	4,500
Construction Energy Payback Period based on Comparison with Alternative (years)	--	No Payback	525	460	175	213	212	378

end of the Embarcadero Freeway, for example, would significantly affect residences in the area.

The construction schedules discussed earlier are a preliminary attempt to develop an efficient construction schedule for each alternative. A detailed schedule would be developed during the preliminary engineering and final design phases. Specific geographic work areas would be identified to attempt to avoid overlapping or conflicting construction activity while still allowing several contractors to work simultaneously in alternate areas. This would minimize construction time and limit the area impacted in any one neighborhood. Other considerations when scheduling construction activity should be to ensure access along the Belt Line and if possible, coordinate activity with the Ferry Building reconstruction and South Beach/Rincon Point Redevelopment Agency activity.

b. Noise and Vibration

In areas where residential uses could be impacted by the noise, construction should be limited to the hours of 8:00 a.m. to 5:00 p.m. All equipment used during construction would be adequately muffled and maintained. Where possible, equipment powered by electric motors should be used in place of equipment powered by internal combustion engines. Construction activities in a given area should be coordinated to minimize the time any building is exposed to construction noise.

The impact on the Victoria Station restaurant could be mitigated by demolishing the bents and columns in the vicinity of the restaurant during the hours when meals are not being served. Residents of the Golden Gateway Commons and the owners of the Victoria Station restaurant should be notified prior to demolition of the freeway so that they can adjust their schedules. The anticipated noise levels would be so high that additional treatments to the buildings to reduce noise intrusion during demolition would generally be ineffective.

Because of the uncertainty in predicting the vibration levels, a monitoring program should be implemented. Vibration measurement should be made by either the San Francisco Department of Public Works or a qualified acoustical consultant. Measurements would be made in these buildings as demolition approached the building. If at any time levels reach those that could be associated with potential structural damage, the demolition would be ceased and another method of removing the freeway would be used, such as sawing the columns and bents.

c. Vehicular and Pedestrian Access

Vehicular access, though restricted to varying degrees, would be maintained throughout the Embarcadero Corridor during construction activity. Provisions would be made to maintain access to all businesses. Mitigating provisions such as temporary detours, access provisions for adjacent properties, temporary traffic control signs and signals, and restriction on contractor working hours would be developed in detail during the final design phase. Part of this work would also involve developing a detailed implementation schedule. It is anticipated that scheduling would be designed so that construction activities would be completed in small geographical areas rather than throughout an extensive length of street. This would allow simpler and more feasible traffic detours as well as minimize the time that individual businesses and residences would be exposed to adjacent construction activity. Scheduling should also consider that certain areas within the Corridor (such as the Fisherman's Wharf, Fort Mason, and Ferry Building areas) are particularly sensitive to disruption of access. For example, in the Fisherman's Wharf area intensive construction activity should be avoided during peak tourist and shopping seasons (e.g., summer, Thanksgiving, Christmas, Easter).

In addition, because not all construction impacts can be mitigated, it is essential that a good public information program be implemented. People need to be kept informed about demolition/construction activity so that they can adjust their normal activities. Information should be provided via public media, sign postings in the construction area and direct mailings to businesses and residents in the vicinity of construction activity. Opportunities should be provided for community feedback before and during the construction process.

d. Water Quality and Hydrology

Since water quality impacts are primarily related to the introduction of dust, sediment, debris and brackish water into the "closed" storm/sewer system, the following mitigation measures focus on minimizing the amount of material introduced during the construction phase of each element.

In general, the amount of material introduced into the storm/sewer system could be reduced by the following mitigation measures.

- Keeping paved surfaces around the construction site swept clean of spilled spoil during the excavation. The site should not be cleaned with hoses unless drainage is into the excavation and away from the sewer system.

- Passing water pumped from dewatering wells through a simple siltation basin system to allow pumped sediment to settle out prior to discharge into the sewer system.
- Constructing storm drains to trap sediment and facilitate its removal prior to entry into the system.
- Periodically clearing storm drains of trapped sediment and debris.

Mitigation of impacts due to deep excavations and dewatering (below-grade railway work) can best be addressed with an understanding of the subsurface conditions and the potential consequences on the existing structures. For example, a shoring and dewatering method would have to be used adjacent to the old Southern Pacific building to ensure that the water table would not drop below the wooden piles and the ground movement would be within acceptable limits. The water table and ground movement would be monitored by a comprehensive instrument monitoring system to ensure that the effects of the deep excavation are within the acceptable limits. If the monitoring system indicates that the water table or ground movement are approaching unacceptable limits, then other mitigating measures would be taken.

e. **Air Quality**

The following mitigation measures could be used during construction activity to minimize air quality impacts.

- During demolition and construction activities, unpaved areas should be watered nearly continuously on hot and windy days (as needed). This would reduce dust emissions by about 50%.[29]
- Haul trucks should use tarpaulins to reduce windblown dust.
- Construction equipment should avoid using residential streets. In the study corridor this includes streets around the Golden Gateway project and streets at the base of Telegraph Hill.
- Construction equipment should be turned off while not in use.
- Demolition activities would be required to follow regulations promulgated by the Bay Area Air Quality Management District.
- Landscaping should be completed as soon as site grading is completed and before the rainy season begins.

f. Ecology

Vegetation should be replanted in areas where vegetation was removed during construction. Vegetation should include native and fruit-bearing species. To avoid leaching of toxic lye from concrete into nearby water, temporary dikes should be used to protect concrete while it cures. Because a certain amount of sedimentation would occur in the China Basin during nearby construction activity, consideration should be given to avoiding construction activity that involves extensive earthwork during the herring spawning season (mid-November to March).

G. CUMULATIVE IMPACTS

The potential cumulative impacts associated with the I-280 TCP have to be viewed within the context of various government plans for the project area, and are dependent upon which alternative is selected for implementation. Selection of projects other than those identified under Alternative I (the No Project alternative) would tend to influence the location of future development within the project area, rather than influence the magnitude of future development above that identified in the City's Downtown Plan, Northeast Waterfront Plan, Rincon Point/South Beach Redevelopment Plan, and Comprehensive Plan. Hence, potential I-280 TCP cumulative impacts must be viewed within the framework established by local plans, as well as the relevant state and federal plans for the project area (see Table VII-1), which are consistent with the local plans listed above.

Many of the impacts associated with the I-280 TCP are similar to those identified in the Downtown Plan EIR. This EIR consitutes an exhaustive analysis of the impacts of cumulative development under full buildout conditions permitted by the Downtown Plan. The Plan itself has attempted to reduce major environmental impacts stemming from downtown development by:

- reducing overall development, thereby reducing cumulative effects;
- redirecting growth away from sensitive residential neighborhoods north of Market Street (e.g., North Beach and Chinatown), thereby reducing adverse impacts on those areas:
- encouraging future development in the area south of Market Street, where transportation and transit improvements can reduce transportation impacts associated with buildout permitted by the Downtown Plan.

The I-280 TCP can be viewed as a measure to reduce the cumulative impacts associated with development permitted under the Downtown Plan, as well as other plans which affect the I-280 TCP project area in that the TCP can reduce the transportation impacts associated with permitted development. Thus, within the plan framework mentioned earlier, and the role of the TCP as a means to reduce the cumulative effects of those plans, the TCP itself has no significant cumulative impacts.

REFERENCES FOR CHAPTER V

[1]San Francisco Redevelopment Agency, Rincon Point-South Beach Redevelopment Plan, January 1980, page 7.

[2]San Francisco Department of City Planning, Rincon Hill Area Plan Initial Study, 82.89E, May 20, 1983.

[3]Working Paper 2.2.2, Table VII-10, page VII-22.

[4]It is important to note that employment generated during both phases to some extent represents a shift from other projects which might otherwise be funded and operated. That is, federal and state capital funding monies used for the I-280 transfer concept program could possibly be allocated to the region in any case and generate labor expenditures on other projects were they not diverted to the I-280 project. Similarly, maintenance personnel may not represent new employment, but rather a reassignment of existing personnel. Dennis Fay, MTC Personal Communication, June 20, 1983; Richard Cunningham, Superintendent of Street Repair, San Francisco Department of Public Works, telephone communication, July 13, 1983.

[5]The specific businesses are listed in I-280 Transfer Concept Program Working Paper 2.2.4. Precise information on the numbers of people employed in businesses displaced by Alternative VA is not available.

[6]A discussion of the derivation of these costs is presented in I-280 Transfer Concept Program Working Paper 2.2.10b.

[7]Russell Sayre, Caltrans I-280 Transfer Concept Program Project Manager, telephone conversation, September 1, 1983.

[8]Letter from Arthur E. Teele, Jr., Administrator, UMTA, and R.A. Barnhart, Administrator, FHWA to George Deukmejian, Governor of California, dated May 24, 1983; and letter from Bruce E. Cannon, Division Administrator, FHWA to Russell Sayre, I-280 Transfer Concept Program Project Manager.

[9]MTC 1984-88 Transit Capital Priorities.

[10]The estimates for the transportation analysis are based on ABAG employment estimates and are therefore different from any estimates in the Downtown EIR Consultant's Report or the DRAFT EIR for the Downtown Plan, which use a different method for predicting employment. Therefore, the information in the I-280 TCP EIR and the EIR on the Downtown Plan cannot be directly compared, though they reach generally similar conclusions when discussing similar issues. It is also noted that all Alternatives except for the 'No action' Alternative cover situations not included in the Downtown EIR calculations (although freeway removal will be discussed generally in the Downtown Plan EIR).

[11] Block-hours: The summation of the number of blocks where queuing would be present, multiplied by the number of hours duration.

[12] Dames and Moore, "Soils, Seismicity and Geology" in I-280 Transfer Concept Program Draft Technical Working Paper 2.2.3, Parsons Brinckerhoff Quade and Douglas, Inc., San Francisco, California, December 20, 1982.

[13] U.S. Army Corps of Engineers, Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, Technical Report H-75-17, Vicksburg, Mississippi, November 1975.

[14] A. Montanari, Engineer, San Francisco Water Department, Engineering Branch, telephone communication, August 16, 1983.

[15] Harriet Sakuma, San Francisco Clean Water Program (SFCWP), telephone communication, August 24, 1983.

[16] Harriet Sakuma and Don Hayashi, information Branch, SFCWP, personal communication with Eric McHuron, Dames and Moore, Geotechnical Consultants, January 1983.

[17] Parsons Brinckerhoff Quade & Douglas, Inc., "Technical Working Paper on Hydrology and Water Quality," I-280 Transfer Concept Program Subtask 2.2.3 Environment, February 8, 1983, page 40.

[18] Don Birrer, Executive Director, SFCWP, personal communication, November 13, 1982.

[19] M. Rombanis, Assistant Superintendent, Catch Basin Maintenance, SFCWP, telephone communication June 27, 1983.

[20] Stability is represented as Class A through F, with Class F representing the poorest conditions for dispersal of pollutants.

[21] California Air Resources Board, Research Division, Air Quality Modeling Section, Estimating Carbon Monoxide Concentrations for Hot Spots Analysis, Sacramento, California, May 1980.

[22] California Air Resources Board, Regional Programs Division, General Projects Section, EMFAC6C Emission Factors, California Statewide Mix of Vehicles 1980-2000, Sacramento, California, October 1981.

[23] Federal Highway Administration, Offices of Research and Development, Transportation Issues Related to Short-Term Nitrogen Dioxide Air Quality Standard, FHWA-RD-78-172, Washington, D.C., July 1979.

[24] Throughout this section, references are made to potential increases or decreases in noise levels during the noisiest hour. It is noted that the expected distribution of traffic throughout the day will be the same as at present except for a lengthening of the peak traffic period. The variation of noise levels throughout the day would be about the same and therefore changes in noise level during all hours would be the same as during the noisiest hour.

[25] Richard M. DeGraaf. Management of Wooded Areas for Songbirds and Other Wildlife. U.S. Department of Agriculture. 1978, pages 133-138.

[26] Caltrans. Energy and Transportation Systems. Sacramento. December 1978.

[27] Mission Bay San Francisco Planning News. July/August 1983.

[28] Meekler, Milton. Energy Conservation in Buildings and Industrial Plants. McGraw-Hill, New york. 1980.

[29] U.S. Environmental Protection Agency. Guidelines for Development of Control Strategies in Areas with Fugitive Dust Problems. OAQPS. No. 1.2-071. October 1977.

VI. HISTORIC AND ARCHAEOLOGICAL RESOURCES AND PARKLAND

INTRODUCTION

This chapter of the Draft EIR presents an inventory of cultural resources in the project area, and identifies potential impacts upon these resources which could occur with implementation of any of the eight alternatives under consideration. For the purposes of this chapter, cultural resources include: historical/architectural and archaeological resources, as well as relevant existing and proposed public parkland resources.

While not legally required for an EIR document, this chapter is organized in a format which facilitates review of project alternatives pursuant to Section 4(f) of the Department of Transportation Act (49 USC 1653 (f)), which requires that historic sites and publicly owned parklands not be used for transportation projects which involve the use of federal funds, unless there is no feasible and prudent alternative to the use of such land, and all possible planning to minimize harm to these resources has been undertaken.[1]

In addition, this chapter is also organized in a format which facilitates review pursuant to Section 106 of the Historic Preservation Act of 1966 (16 USC 470). Policies developed under Section 106 require in part that, prior to approval of Federal activities, agencies should consider the effect of any undertaking on any district, site, building, structure or object that is included or eligible for inclusion on the National Register of Historic Places. The Advisory Council for Historic Preservation should be given an opportunity to comment on such undertakings.

A. HISTORIC/ARCHITECTURAL RESOURCES

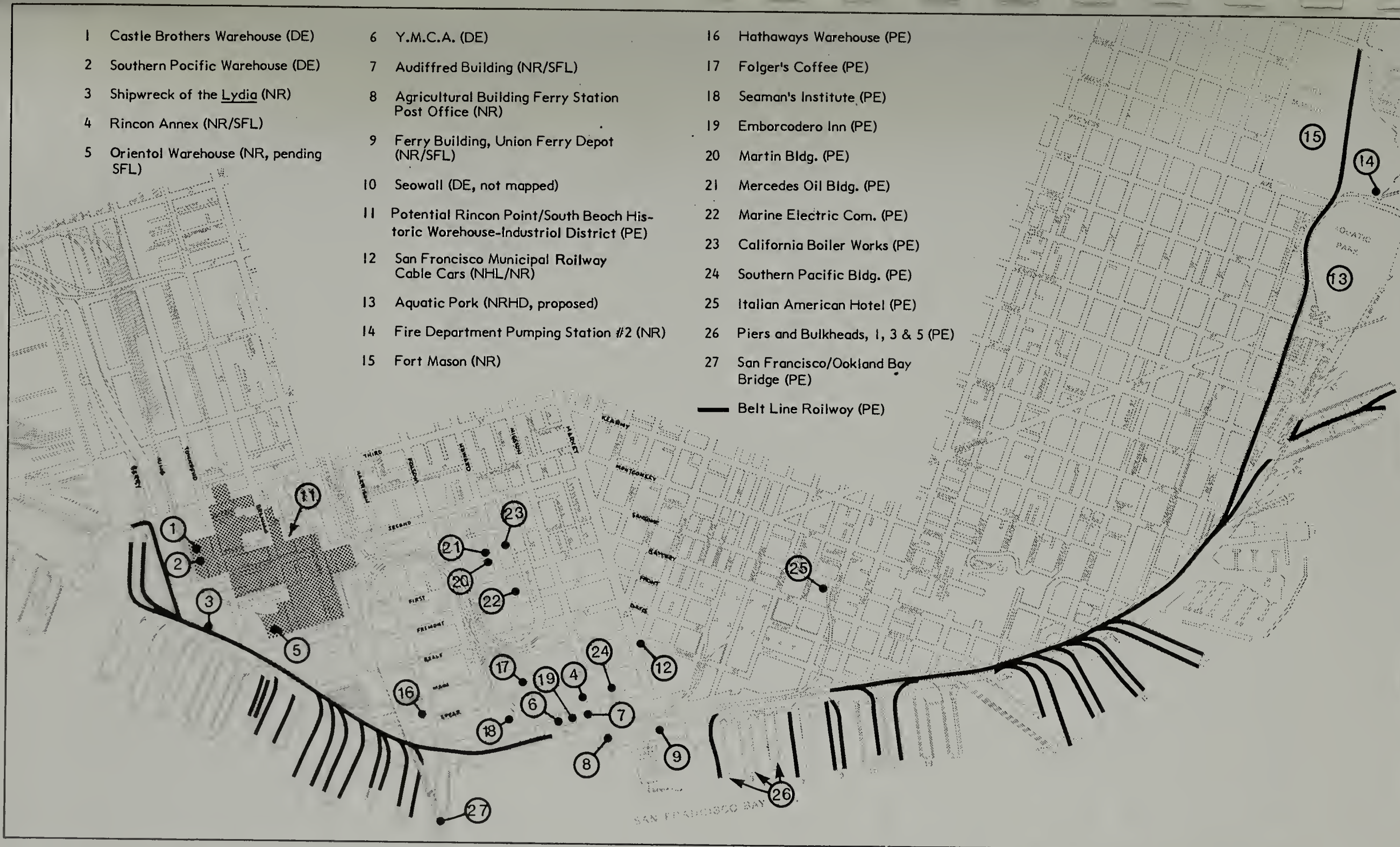
For the I-280 Transfer Concept Program, a preliminary historical resources assessment was prepared by David Chavez, consulting archaeologist, and by Page, Anderson and Turnbull (Working Paper 2.2.5) and A Historic Properties Survey report was prepared by Caltrans.[2] Existing historic and architectural inventories were consulted in preparation of the Historic Properties Survey Report, including the National Register of Historic Places, National Historic Landmarks, the California Inventory of Historic Resources, California Historical Landmarks and the City and County of San Francisco Landmarks.

Twenty-eight resources within the Area of Potential Environmental Impact (APEI) of the proposed alternatives are identified in the Historic Properties Survey Report that are either listed on the National Register, determined eligible for, or judged potentially eligible for this listing. Figure VI-1 lists these resources and indicates their locations and National Register status. A description of each can be found in Appendix F. Final determinations on the potentially eligible resources will be made after consultation with the State Historic Preservation Officer (SHPO) and the keeper of the National Register.[3] The Federal Highways Administration (FHWA) and Urban Mass Transportation Administration (UMTA), along with the SHPO, were involved in establishing the APEI. It was agreed that all buildings to be affected or removed for the project, as well as one row of buildings beyond, were to be evaluated.

The nature of each historic resource determines whether the impacts are beneficial or adverse. The proposed project would have an effect on a resource if it would cause a change in the quality of the property's characteristics which qualify it for inclusion on the National Register. The Criteria for Evaluation,[4] which were applied to each resource in determining its National Register eligibility, form the framework for evaluating potential impacts. The Criteria for Evaluation state:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. that are associated with the lives of persons significant in our past; or
>
> C. that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. that have yielded, or may be likely to yield, information important in prehistory or history.

The impacts evaluation for each resource focuses on potential changes in the qualities that make it eligible for the National Register. Accordingly, buildings that are determined to meet National Register criteria C, for example, are noted primarily for their architecture and an impact would only occur if the building itself were to be removed or altered or its architectural qualities were changed in a significant way.



HISTORIC RESOURCES

NHL: National Historic Landmark
NR: Listed on National Register
DE: Determined Eligible for National Register
NOTE: Figure only shows remaining portion of original Belt Line track alignment.

NRHD: National Register Historic District
SFL: City and County of San Francisco Landmark (Designated under Article 10 of Planning Code)
PE: Potentially eligible for National Register

SCALE 0 800 1600 2400 FEET

VI-1

1. Description of Historic Resources

The twenty-eight historic resources identified within the area of potential environmental impact of the alternatives under consideration are described in Appendix F.

2. Impacts on Historic Resources

The following section considers potential impacts to each historic resource that could occur with implementation of Alternatives II-VI. Alternative I would not affect any historic resources. This section focuses on long-term impacts associated with operation of each alternative. All alternatives except Alternative I, the No Project Alternative, would cause some temporary disruption of historic resources during construction; these short-term impacts would be mitigated. Construction impacts are discussed more fully in Section V.F., Construction, of this EIR.

With regard to the long-term impacts discussed in this section, some of the historic buildings would not be affected by any of the alternatives; in other cases it appears there may be both beneficial and adverse effects resulting from a particular alternative. After a project is selected for further development an assessment of its effect on each historic resource that is listed on or determined eligible for the National Register will be conducted. The SHPO and the Advisory Council on Historic Preservation will then prepare a formal Determinations of Effect and Preliminary Case Reports on each resource, using the National Register Criteria of Effect described in 36 CFR 800.3.

The impacts discussion below begins in the China Basin segment and proceeds north to Fort Mason, except that some buildings have been grouped together to simplify the impacts discussion. Table VI-I summarizes, in matrix form, the probable impacts to each of the 28 resources.

Potential Rincon Point/South Beach Historic Warehouse-Industrial District (11). Potential impacts would occur to only the southernmost buildings in this potential Historic District, including the Castle Brothers Warehouse (1) and the Southern Pacific Warehouse (2). Alternatives II-VI would each involve reconstruction of King Street to anywhere from a two- to eight-lane roadway. Removal of some or all of the existing warehouses in the block between Second, Third, King and Berry Streets would occur but these structures do not contribute to the unique qualities or setting of buildings in the potential Historic District. In each alternative, the existing access and relationship of buildings in the

Table VI-1
HISTORIC RESOURCES IMPACTS SUMMARY

RESOURCE	ALTERNATIVE							
	I	II	III	IV	IVA	V	VA	VI
1. Castle Brothers Warehouse	o	o	o	o	o	-	-	-
2. Southern Pacific Warehouse	o	o	o	o	o	-	-	-
3. Shipwreck of the Lydia	o	o	o	o	o	o	o	o
4. Rincon Annex	o	o	o	o	o	-	o	-
5. Oriental Warehouse	o	o	o	o	o	o	o	o
6. Y.M.C.A.	o	o	+	+	+	+	+	o
7. Audiffred Building	o	o	+	+	+	+	+	o
8. Agricultural Building/Ferry Station Post Office	o	+	+	+	+	+	+	+
9. Ferry Building	o	+	+	+	+	+	+	+
10. Seawall	o	o	o	o	o	o	o	o
11. Potential Rincon Point-South Beach Historic Warehouse/Industrial District	o	o	o	o	o	-	-	-
12. San Francisco Municipal Railway Cable Cars	o	o	o	o	o	o	o	o
13. Aquatic Park	o	o	-	-	-	-	-	-
14. Fire Department Pumping Station #2	o	o	o	o	o	o	o	o
15. Fort Mason	o	o	-	-	-	-	-	-
16. Hathaways Warehouse	o	o	o	o	o	o	o	o
17. Folger's Coffee	o	o	o	o	o	o	o	o
18. Seamen's Institute	o	+	+	+	+	+	+	+

Table VI-1 (continued)

RESOURCE		ALTERNATIVE							
		I	II	III	IV	IVA	V	VA	VI
19.	Embarcadero Inn	o	o	+	+	+	+	+	o
20.	Martin Building	o	o	o	o	o	o	o	o
21.	Mercedes O.I Building	o	o	o	o	o	o	o	o
22.	Marine Electric Company	o	o	o	o	o	o	--	o
23.	California Boiler Works	o	o	o	o	o	o	--	o
24.	Southern Pacific Building	o	o	o	o	o	o	o	o
25.	Italian American Hotel	o	o	+	+	+	+	+	o
26.	Piers and Bulkheads 1, 3 & 5	o	+	+	+	+	+	+	o
27.	San Francisco/Oakland Bay Bridge	o	o	-	-	-	-	-	o
28.	Belt Line Railway	o	o	-	-	-	-	-	-

LEGEND:

- o No Impact
- \+ Beneficial Impact
- \- Minor Adverse Impact
- -- Significant Adverse Impact

District to the street would be maintained; no impacts to any of these buildings would result from reconstruction of King Street. Similarly, the proposed E-Line/Muni Metro extension in the median of King Street under Alternatives IV, IVA, and VA would have no impact on the qualities of these buildings which make them eligible for the National Register. Although Alternatives V and VI would align the Muni routes along the north side of the roadway in this area, closer to the buildings in the potential Historic District, there would still be no adverse impact to any of these buildings since the tracks and overhead wires would not detract from the National Register qualities of the buildings. Alternative III would route the E-Line/Muni Metro in the median of Townsend Street. Again, no impacts to the National Register qualities of the buildings in the potential District would be expected from this action. The proposed ramps from the existing stub-end of the I-280 Freeway in Alternatives V-VI would alter the setting of the nearest buildings in the Historic District, including the Castle Brothers and Southern Pacific Warehouses. The ramps would contrast in character and scale with these historic buildings; they would functionally and visually separate these buildings from the rest of the China Basin area; they would preclude construction of more compatible development south of the potential Historic District; and the on-ramp in particular would introduce an aural intrusion to the setting of the historic buildings. The proposed surface Peninsula Commute Service extension in Alternatives V and VI would have negative impacts to buildings along King Street in the potential Historic District due to the aural intrusion of the trains and the construction of six-foot high sound walls 35 feet south of the historic building facades. Negative impacts to the settings of some buildings in the potential Historic District would occur with construction of new I-280 Freeway on- and off-ramps to Second Street, proposed in Alternatives V and VI. A section 4(f) evaluation may be required if the two warehouses are affected.

Oriental Warehouse (5). This structure would not be affected by the surface Peninsula Commute Service extensions described above since it is set back from the proposed rail right-of-way by approximately 150 feet. Alternatives II, III, IV, V, VA and VI would reduce but not eliminate access to the front of this structure by allowing only local access to buildings on First Street south of its intersection with Bryant Street. Since these alternatives would enable the building to remain functional by preserving service access and would not compromise the qualities that make the building potentially eligible for the National Register, this street closure is not considered a significant adverse impact. Alternative IVA would not have any effect on the Oriental Warehouse since this alternative maintains the existing street configuration nearby.

Shipwreck of the Lydia (3). This historic resource is presently five and one-half feet below the surface and would not be disturbed under any of the alternatives. However, it should be noted that reconstruction of the Embarcadero roadway, proposed in Alternatives II-VI, would resurface the pavement over the remains of the Lydia, possibly making it less likely that this resource would be studied in the future.

Hathaway's Warehouse (16). This building would not be affected by any of the alternatives except perhaps during the construction phase of the Peninsula Commute Service extension in Alternatives V and VI which would be below grade at this point. As discussed in Section V.F. Construction, any potential impact to the sub-lateral support of the structure during construction could be mitigated by standard construction techniques such as additional dewatering and support measures.

Seaman's Institute (18). The proposed E-Line/Muni Metro extension in Alternatives III-VI would pass near this building but, as discussed under the proposed Rincon Point/South Beach Historic Warehouse-Industrial District, the addition of overhead Muni electrical wires and regularly scheduled trolley cars would not alter the building or add visual or audio intrusions to its immediate setting that could compromise qualities making it potentially eligible for the National Register. Although Steuart Street would be closed to through-traffic in the block containing the Seaman's Institute, local access to the buildings in this block would be maintained. Realignment of the Embarcadero roadway under Alternatives II-VI in this area would involve demolition of five structures in the block between this building and the Embarcadero roadway. These buildings do not contribute to the quality of the setting of the Seaman's Institute and their demolition would strengthen its relationship to the waterfront while opening up new views to this building. Removal of the Embarcadero Freeway without building a new on-ramp, as proposed in Alternatives III and IV, would have beneficial impacts on the Seaman's Institute by removing a structure that presently overshadows, blocks views to and separates the building from the waterfront. Alternatives IVA-VA would replace the existing freeway structure, which lies behind the building, with an on-ramp. Visually this would be a small improvement over existing conditions, although noise levels would be marginally changed, if at all.

Folger's Coffee (17). The qualities which make this building potentially eligible for the National Register would not be positively or negatively affected under any of the

Alternatives. Embarcadero Freeway removal, proposed under Alternatives III-VI, would not alter the existing building or its immediate setting since the freeway is located more than 150 feet from the building.

Y.M.C.A.(6), Embarcadero Inn (19) and Audiffred Building (7). Positive impacts to all of these structures would be due to demolition of the Embarcadero Freeway, proposed in Alternatives III-VA. Freeway demolition would restore the traditional relationship between these buildings and the waterfront. The architectural qualities of these buildings would be more easily viewed due to improved lighting and visual access following freeway removal.

Rincon Annex (4). This structure would be renovated under Alternatives V and VI to accommodate a below-grade Peninsula Commute Service terminal. This would require demolition of the back, or south, side of the building so that it could be rebuilt to accommodate the terminal. The building's north facade and lobby, the features for which it is architecturally significant, would be retained. The front of the building would continue to serve as a retail post office, its use since it was constructed. Because the lobby and the murals are the primary features which have qualified the building for the National Register, it is believed that construction of the rail terminal on the site could be undertaken without major adverse effects to the building's historical qualities. If this terminal location were to be considered further, the impact would have to be assessed in a Section 4F evaluation. Approvals from the Advisory council on Historic Preservation would be required and the City's Landmarks Board would review the proposed alterations to the property through the Certificate of Appropriateness process.

Southern Pacific Building (24). This building would not be modified under any of the alternatives. Construction of the Muni Metro turnback or turnaround, proposed in Alternatives II-VI, would occur in Market Street adjacent to this buildng. The turnback or turnaround would be located below-grade and would have no long-term effects on the Southern Pacific Building. As discussed in Section VF, Construction, short-term construction impacts could be mitigated by standard dewatering and sub-lateral support techniques. Other activities that would occur nearest this structure would be renovation of the Rincon Annex, under Alternatives V and VI, and removal of the Embarcadero Freeway, under Alternatives III-VA. Renovation of the Rincon Annex would have no effect on the Southern Pacific Building; Embarcadero Freeway removal, however, would have a positive

impact on the setting of this building by removing a structure which currently separates it from the waterfront.

Agricultural Building (8) and Ferry Building (9). As with the buildings of the East Row, (Y.M.C.A., Embarcadero Inn and Audiffred Building), the Agricultural and Ferry Buildings would experience substantial positive impacts under Alternatives III-VA, which propose removal of the Embarcadero Freeway. This action would restore the Ferry Building's visual prominence at the foot of Market Street, recalling a time when the building served as the focus for many of the City's transit networks. This historic role of the Ferry Building as a focus for transit interchange would also be recognized in Alternatives IV-VI, which provide Muni Metro/E-Line/F-Line connection near the Ferry Building. Reconstruction of the Embarcadero roadway, proposed in Alternatives II-VI, would have positive impacts since all these alternatives would remove parking from the median, reduce roadway width and add to the open space in front of the Ferry Building. A pedestrian crossing design option in Alternative IVA would involve construction of a pedestrian bridge across the Embarcadero roadway. If this design option is incorporated into Alternative IVA, it would have an adverse impact on the architectural integrity of the Ferry Building since the bridge would obscure portions of the building from view and could require some modification of its facade if it were designed to connect with the building at the second level.

San Francisco Municipal Railway Cable Cars (12). None of the alternatives would involve alterations to the Cable Cars or the area of the California Street terminus. However, the possible use of unique vintage streetcars or buses along the Embarcadero roadway would complement the historic and recreational nature of the Cable Cars.

Martin Building (20) and Mercedes Oil Company Building (21). The Martin and Mercedes Buildings would not be altered by any of the alternatives and the qualities which make them eligible for the National Register would not be affected.

Marine Electric Company (22) and California Boiler Works (23). Impacts to these buildings would occur in Alternative VA and would depend on the method of construction used for the proposed below-grade Peninsula Commute Service extension to the area south of the Transbay Terminal. If standard cut-and-cover construction methods are used, then both buildings would be demolished to accommodate the proposed rail terminal; clearly an

adverse impact. An alternative method of construction would involve tunneling underneath these buildings to avoid their demolition. Tunneling, however, may not prove to be practical due to unfavorable site conditions. It would also be an expensive solution. An alternative mitigation measure to avoid demolition of these buildings would be to relocate the proposed rail terminal to beneath the existing Transbay Terminal. This measure would also be very expensive and difficult to implement. An alternative alignment for the proposed rail extension, however, might avoid the need to demolish these building.

If the rail terminal location proposed in Alternative VA is selected and if the cut-and-cover method of construction is determined necessary, then severe negative impacts would occur to these buildings of potential National Register eligibility (see Figure A-3 for photo of these buildings). The impacts on these buildings may have to be assessed in a Section 4(f) evaluation.

Piers and Bulkheads 1, 3 and 5 (26). The setting for these structures would be improved under Alternatives III-VA due to removal of the Embarcadero Freeway. The bulkheads would not be modified but light and visual access to them would be improved with freeway removal. The amount of sidewalk area in front of the bulkheads would be increased by up to 12 feet in width due to reconstruction of the Embarcadero roadway in Alternatives II, III, IV and IVA; this would further improve the settings of these structures. Addition of the Muni E-Line in the roadway in front of the bulkheads, as proposed in Alternatives III-VI, would not add sufficient audio or visual intrusions to detract from the qualities which identify the bulkheads as potentially eligible for the National Register.

Seawall (10). Alternatives II-VI all involve reconstruction of the Embarcadero roadway adjacent to the Seawall; in none of these alternatives, however, would the Seawall be altered.

Italian American Hotel (25). This building would not be altered by any of the alternatives. However, the setting of the Italian American Hotel would be greatly improved by removal of the Embarcadero Freeway, since the Broadway Street on-ramp is immediately adjacent to the north side of this building.

Aquatic Park (13) and **Fort Mason (15).** Impacts to these historic resources are discussed in Section VI.D, Parklands.

__Fire Department Pumping Station No. 2(14).__ Neither this structure nor its setting would be altered by the proposed E-Line in Alternatives III-VI. The alignment and impacts of the E-Line are discussed further in Section VI.C. Parklands.

__Belt Line Railway (28).__ In the China Basin area, Alternatives IV-VI would relocate the existing Belt Line tracks in Berry Street to the vicinity of the proposed King Street alignment. Some or all of the existing original Belt Line tracks through the South Beach/Rincon Hill segment would be relocated under all alternatives except Alternative II. Between Howard and Vallejo Streets, Alternatives II-VI would relocate the existing tracks, which are not part of the original Belt Line, to lie in the reconstructed Embarcadero roadway. North of Vallejo Street the existing Belt Line tracks would be retained for service in Alternative II; in Alternatives III-VI the existing tracks would be retained and a new set would be added for the E-Line. North of Pier 35, where Belt Line service presently terminates, the existing Belt Line tracks along Jefferson Street and through Aquatic Park/Fort Mason would be used for the E-Line in Alternatives III-VI. While the project would, in varing degrees, require relocation of some of the existing Belt Line railway tracks, none of the alternatives would hinder the continued operation of the railroad. It is expected, therefore, that the project would not adversely affect this resource, and may in fact enhance it by adding passenger rail service (Alternatives III-VI). If any of the Alternatives III-VI is selected, the impacts on this resource may have to be assessed in a Section 4(f) evaluation.

__San Francisco-Oakland Bay Bridge (27).__ Alternatives II-VI propose to locate an intercept parking structure or lot beneath the Bay Bridge on a currently vacant block between Bryant and Harrison Streets. The parking structure or lot would not alter the bridge or affect the qualities which make it potentially eligible for the National Register. However, it should be noted that any structure more than two stories in height would block views of the cable anchorage at the base of the bridge. Alternatives III-VA propose modification at the west end of the bridge to accommodate an extra lane on the Fremont Street off-ramp. The impacts of this action on the Bay Bridge, while expected to be minor cannot be fully analyzed until further engineering and design studies are completed. If one of these alternatives is selected then the impacts on the Bay Bridge may have to be assessed in a Section 4(f) evaluation.

B. ARCHAEOLOGICAL RESOURCES

The archaeological resources assessment for the I-280 Transfer Concept Program was prepared by David Chavez, consulting archaeologist, Lawrence Shoup, Consulting Historian (Working Paper 2.2.5) and Mara Melandry, Caltrans. The Area of Potential Environmental Impact (APEI) for archaeological resources was determined by Caltrans in conjunction with FHWA, UMTA and the State Historic Preservation Officer. Specifically, the APEI includes areas where substantial subsurface excavation would be necessary for underground portions of the Peninsula Commute Service or Muni Metro extensions.

Other subsurface work would be very shallow and less substantial; precise engineering details about that work are not known at this time. When the project is further refined and impacts are more precisely understood, additional discussion on the scope of study will be conducted and more historic research accomplished. It was agreed that for the purpose of preparing the Historic Properties Survey Report, only those archaeologically sensitive areas that are located in known or possible areas of subsurface construction were to be identified. It was further agreed that only after a preferred alternative is selected, should detailed archival research be conducted to determine potential impacts to archaeological resources. At this time, areas possessing archaeological sensitivities are identified and discussed in the Historic Properties Survey Report. Due to the heavily urbanized nature of the project area, it was agreed that an on-foot reconnaissance was unnecessary.

1. Historic and Prehistoric Archaeological Resources

A summary of the historic and prehistoric archaeological setting within the APEI is included in Appendix F.

2. Impacts on Historic and Prehistoric Archaeological Resources

Virtually the entire area of impact can be judged as archaeologically sensitive. Once a project is selected, further archival research will be conducted to assess potential significance and integrity of archaeological remains. It is also possible that construction may uncover totally unsuspected and undocumented resources, such as ships encapsulated in Bay fill.

3. Mitigation Measures for Archaeological Resources

Because auger borings in recent archaeological investigations in the waterfront area have not been particularly successful in evaluating archaeological materials, except in the case of very well-documented resources, a tentative agreement was reached at the time the APEI was determined that archaeological monitoring in sensitive areas should be built into the construction contracts. The construction monitoring would be preceded by intensive archival research some of which has already been accomplished. Should evidence of cultural or historic artifacts of significance be found during project excavation, construction activities in this vicinity would cease until evaluation of their significance and implementation of a data recovery program, if necessary, are completed. "Time buffers" for data recovery work needed would be built into the construction contracts.

C. PARKLAND RESOURCES

For Parklands, the evaluation process undertaken for the I-280 Transfer Concept Program was first to identify potential involved parklands, then coordinate with the agencies having jurisdiction over them, and then to prepare an evaluation of the Parklands and potential project impacts upon them.

The initial identification of potentially affected parklands was conducted in April 1983. Eleven candidate parklands or open space areas in the I-280 Corridor were reviewed. Coordination meetings with representatives of Caltrans, MTC, several San Francisco departments and agencies, the National Park Service, and the Urban Mass Transportation Administration were held on May 17 and 19, 1983.

As a result of the coordination meetings, it was decided that two parkland areas would need to be included in the I-280 study, namely Fort Mason/Aquatic Park and Justin Herman Plaza. Subsequent review activities indicated that the proposed Rincon Point/ South Beach Redevelopment Area Park could also be eligible. Based on this it was decided to also include these in the analysis.

1. Description of Open Space and Parklands

a. Aquatic Park/Fort Mason

Aquatic Park and Fort Mason are within the Golden Gate National Recreation Area (GGNRA) of the National Park Service. Fort Mason is listed in the National Register. Aquatic Park was nominated for the National Register and was nominated to be a National Historic Landmark in 1980, but action is still pending. Aquatic Park and Fort Mason include both recreational and historic properties on approximately 96 acres of land. In 1982, there were an estimated 8.4 million visits to the two parks. Aquatic Park alone received an estimated 6.2 million visitors.

Aquatic Park is described by the Park Service as being the most urban of all the units of the Golden Gate National Recreation Area. The intensive waterfront development of the Fisherman's Wharf area, including Ghirardelli Square and The Cannery, adjoins the unit on its south and east sides (see Figure VI-2). Its western limits are defined by the green slopes of Fort Mason. Within the park, the crescent-shaped Municipal Pier is a popular fishing spot and a good place for walkers to gain a unique view of the City and the Bay.

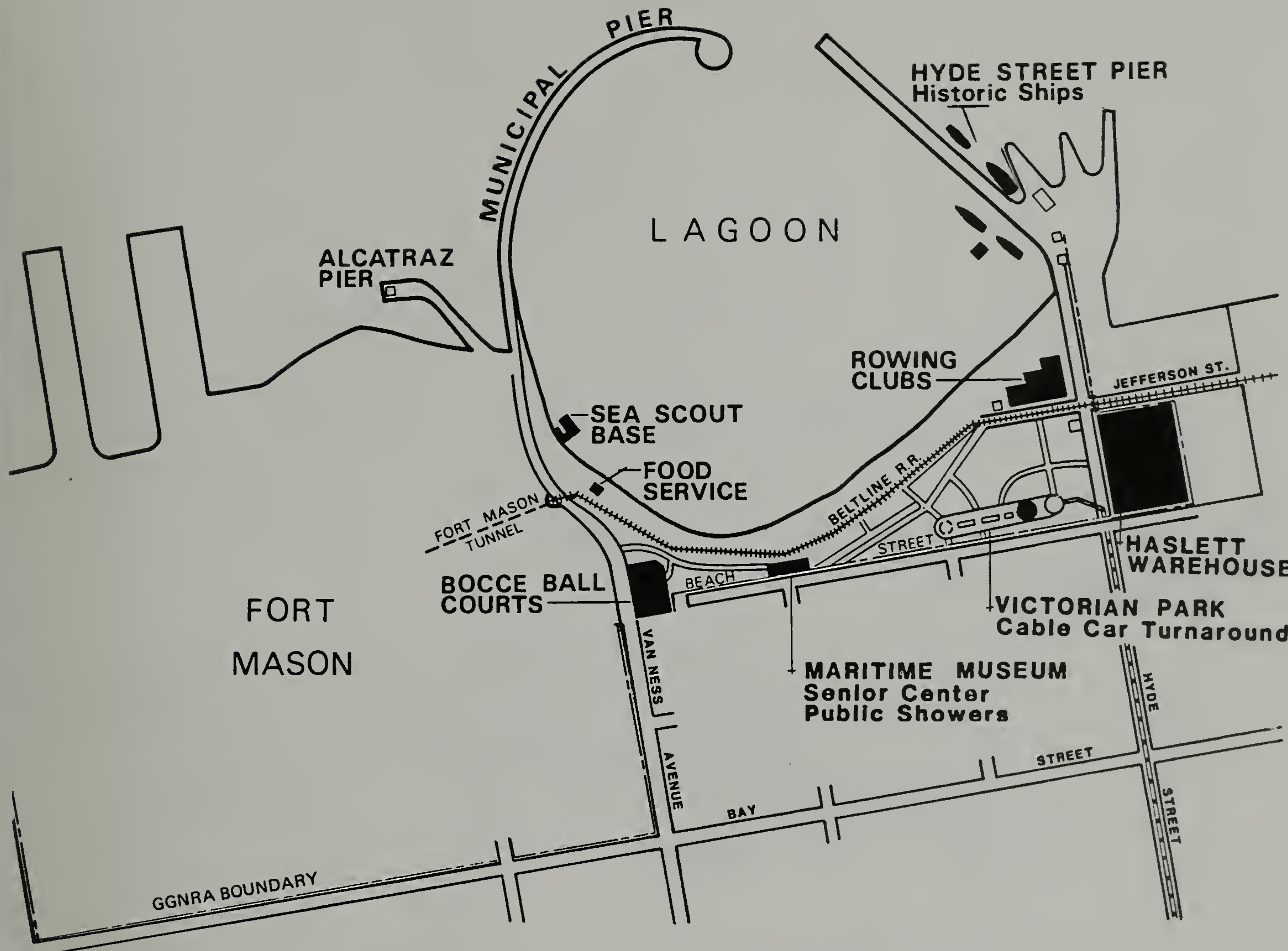
The Hyde Street Pier at the east side of the unit provides berthing space fo the historic ships which are a major asset to the waterfront scene. The Bay waters enclosed by these two piers create a quiet "lagoon" used frequently by the swimmers and rowers headquartered in the three private clubs lining the shoreline adjacent to the foot of the Hyde Street Pier.[5] A former bath house/casino building in the park now houses the San Francisco National Maritime Museum.

Aquatic Park also contains the three-story brick Haslett Warehouse, currently occupied by private offices, at the corner of Beach and Hyde Streets; a landscaped area called "Victorian Park" featuring the Hyde Street cable car turnaround; concrete bleachers oriented around the lagoon; four bocce ball courts; and an open area at the terminus of Van Ness Avenue.

Aquatic Park has a long history as a public recreation resource. The present public improvements in the Park were the result of Work Projects Administration projects completed in the 1930s. The City has reserved easements for access to, and maintenance of, existing sewer and utility lines at a number of locations in Aquatic Park. While these easements roughly follow the alignment of the Belt Line tracks through the park, the City has not retained any rights over use of the tracks. The City has also retained the Cable Car Boarding site at the corner of Hyde and Beach Streets.

Fort Mason adjoins the west side of Aquatic Park and features excellent views of the Bay and the San Francisco waterfront. The site was established as a military reservation in the 1850s and its nearly 60 structures include military residences dating from as early as the 1850s, a Civil War era gun emplacement, docks, pier sheds, retaining walls and the Belt Line railroad tunnel (see Figure VI-3). Today, GGNRA headquarters occupies some of these buildings. In addition, the older pier area and pier buildings have become part of the Fort Mason Center which houses a wide variety of public, non-profit cultural activities including theatre, radio, sculpture, painting and dance. It is one of the few places in the City with facilities large enough to host events such as festivals and fairs.

In addition to its developed waterfront area, Fort Mason features one of the only remaining stretches of natural shoreline on the Bay side of San Francisco. The site's uplands contain the former housing and administrative buildings and building foundations. In the northwestern corner of the site, the topography rises steeply and the slopes are



AQUATIC PARK: EXISTING CONDITIONS

SCALE 0 200 400 800 FEET

SOURCE: G.G.N.R.A., ASSESSMENT OF ALTERNATIVES, PAGE 115.

VI-2

FORT MASON: EXISTING CONDITIONS

SCALE 0 200 400 800 FEET

SOURCE: G.G.N.R.A., ASSESSMENT OF ALTERNATIVES, PAGE 91.

VI-3

covered with vegetation. Much of Fort Mason is landscaped with exotic trees, shrubs and grass. Recreational development has been limited to planting grass and adding picnic tables at former building sites. The park also contains a community garden. Primary activities include jogging, fishing, sunbathing and walking along the Golden Gate Promenade, which passes through the Fort along McDowell Avenue.

The GGNRA General Management Plan/Environmental Analysis, prepared in 1980, includes a discussion of key management objectives for each of the GGNRA park units. The Management Plan recognizes the importance of transportation issues for future park plans and outlines transportation proposals to be considered by the National Park Service and by other agencies. The Plan recommends improved transit and information systems to and within park lands. To complement improved transit service to the park, park shuttles are proposed which could either operate separately from the external transit systems, or be an extension of one of these routes into the park. The following transportation proposal in the General Management Plan is directly relevant to the I-280 Transfer Concept Program:

> A shuttle connecting parklands along the northern San Francisco waterfront utilizing the Belt Line railroad right-of-way. This shuttle, which may utilize historic San Francisco trolley cars, will travel along the existing railroad tracks from Aquatic Park to Crissy Field and may be extended as far as Fort Point. This shuttle will be closely coordinated with current considerations by the City of San Francisco to operate a similar system along the northeastern waterfront, which would create a continuous rail link from the Bay Bridge (SP terminal and BART station) to the Golden Gate Bridge.[6]

In addition, the City's Northeastern Waterfront Plan[7] and the Transportation Element of the Comprehensive Plan[8] also calls for an E-Line streetcar route along the Embarcadero Roadway to and through Fort Mason.

The existing Belt Line tracks through Aquatic Park are at-grade and set in asphalt paving. At the eastern edge of Fort Mason, the tracks enter a tunnel and emerge from a portal near the west gate of Fort Mason at Laguna Street.

b. Justin Herman Plaza

Justin Herman Plaza is a 3.4 acre public park and open space fronting the Embarcadero opposite the Ferry Building. It is one of the complexes of open spaces of the Golden Gate

Redevelopment Area and was created by vacating the terminus of Market Street. The Plaza's property line is bounded by the Muni Trolley Turnaround on the south, with Steuart and Market Streets, the Hyatt Regency Hotel (Embarcadero Five) and Four Embarcadero Center to the west. The northern edge of the Plaza begins at the northeast corner of Four Embarcadero Center and continues eastwardly to the Embarcadero curb line. The eastern edge of the Plaza runs north-south in a straight line inside the Embarcadero curb line (see Figure VI-4).

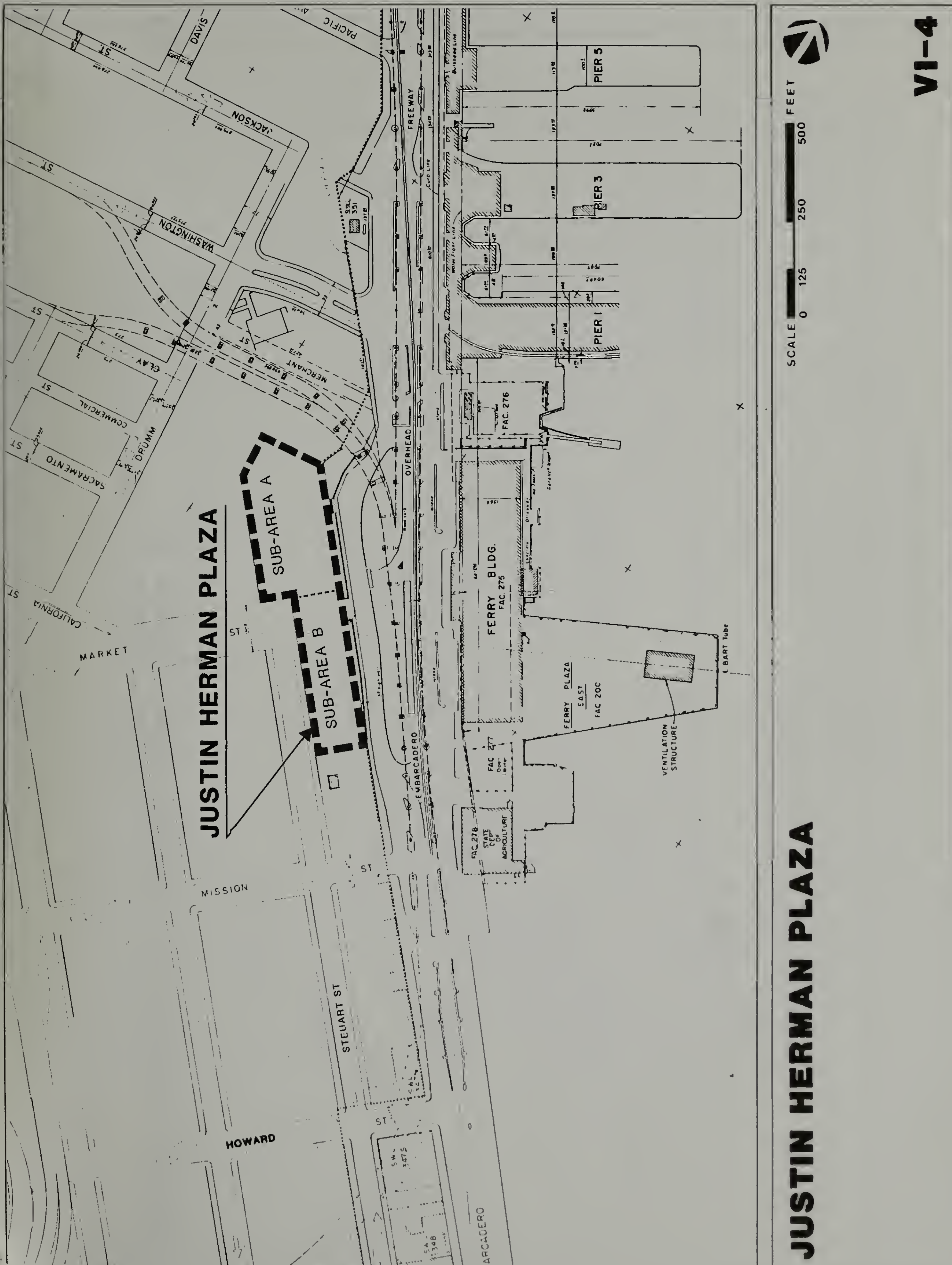
Although the entire Justin Herman Plaza is designated as public land, the Plaza can be described by the type of open space and recreational activity common in two subareas of its boundaries (see Figure VI-4). Subarea A, the more popular and identifiable section of the Plaza, is the paved area at grade between the Embarcadero Center complex and the Embarcadero. This recreational open space features the large concrete Vallaincourt Fountain and irregular five-sided pool which ranges from 100 to 300 feet wide, an outdoor stage called the Plaza Theater, sitting areas, sidewalk cafes along Embarcadero Four, and a landscaped berm along the Embarcadero (see Figure VI-5).

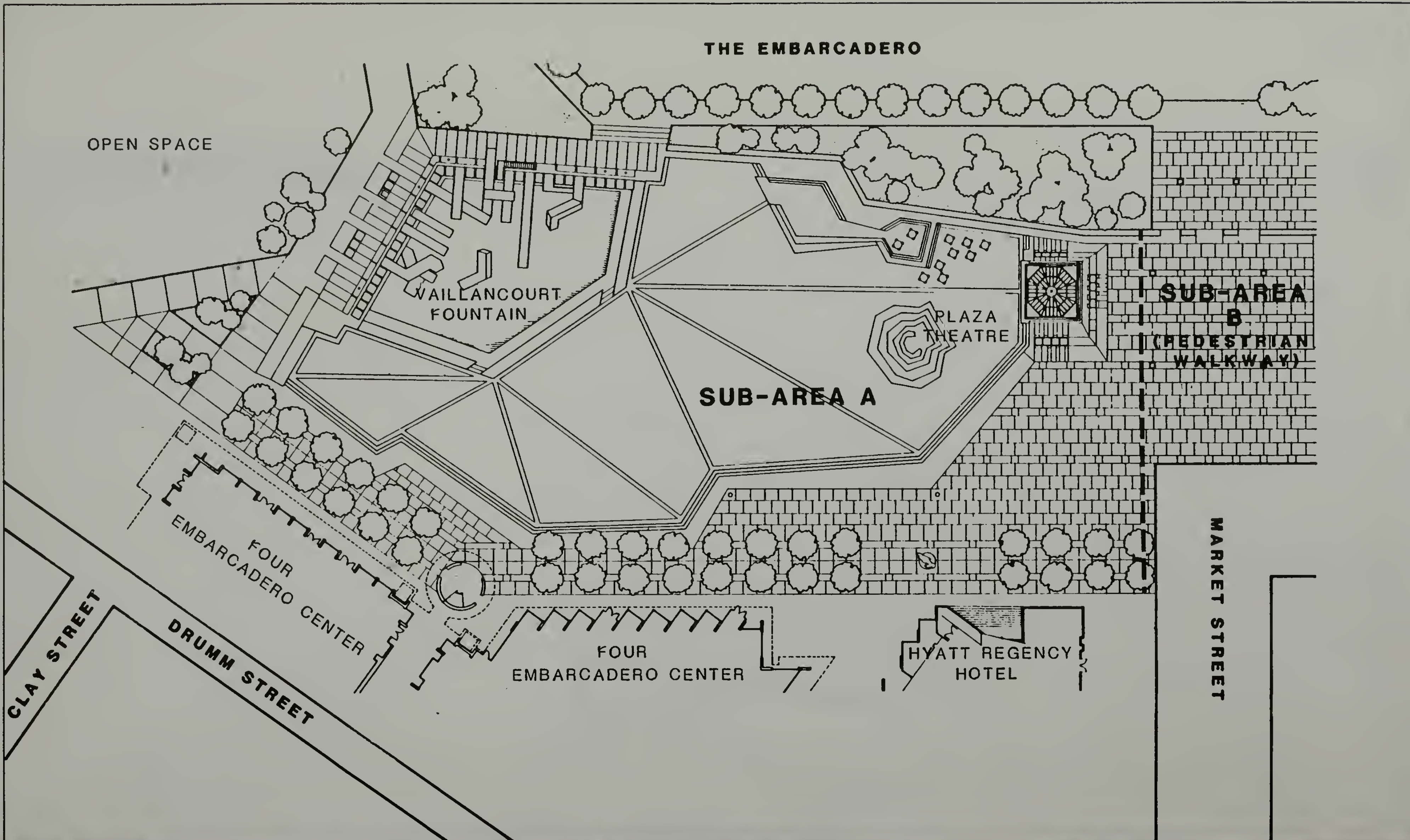
Subarea B includes an exclusive pedestrian walkway connecting the Ferry Building and Market Street, and a landscaped green space for recreational use.

Other lands in the vicinity of Justin Herman Plaza which offer related uses include the landscaped open space under the Clay Street on-ramp and the Washington Street off-ramp. This area north of the Plaza is accessible from it, resulting in a continuous public open space along the Embarcadero.

c. Proposed Rincon Point Park and Existing Promenade.

The Embarcadero Promenade is a waterfront open space along the Embarcadero between the Ferry Building complex and Pier 24. The Promenade has been recently completed while the proposed landscaped Rincon Point Park inland of the recently completed Embarcadero Promenade is part of the adopted Rincon Point/South Beach Redevelopment Plan. The proposed park is also shown in the Northeastern Waterfront Plan, an adopted plan element of the San Francisco Comprehensive Plan. (See Figure VI-6). In the plan, a park of approximately six acres is defined.


JUSTIN HERMAN PLAZA
SUB-AREA A
SUB-AREA B
FERRY BLDG.
FAC. 275
FAC. 276
FAC. 277
FAC. 278
STATE DEP. OF AGRICULTURE
FERRY PLAZA EAST
FAC 20C
VENTILATION STRUCTURE
BART Tube
PIER 1
PIER 3
PIER 5
FREEWAY
OVERHEAD
EMBARCADERO
BARCADERO
STEUART ST
MARKET ST
MISSION ST
HOWARD
CALIFORNIA ST
SACRAMENTO ST
COMMERCIAL ST
CLAY ST
MERCHANT ST
WASHINGTON ST
JACKSON ST
PACIFIC
DAVIS ST
DRUMM
SCALE 0 125 250 500 FEET
JUSTIN HERMAN PLAZA
VI-4



JUSTIN HERMAN PLAZA, SUB-AREA A
SUB-AREA B (partially shown)

NOT TO SCALE

SOURCE: EMBARCADERO CENTER, INC.

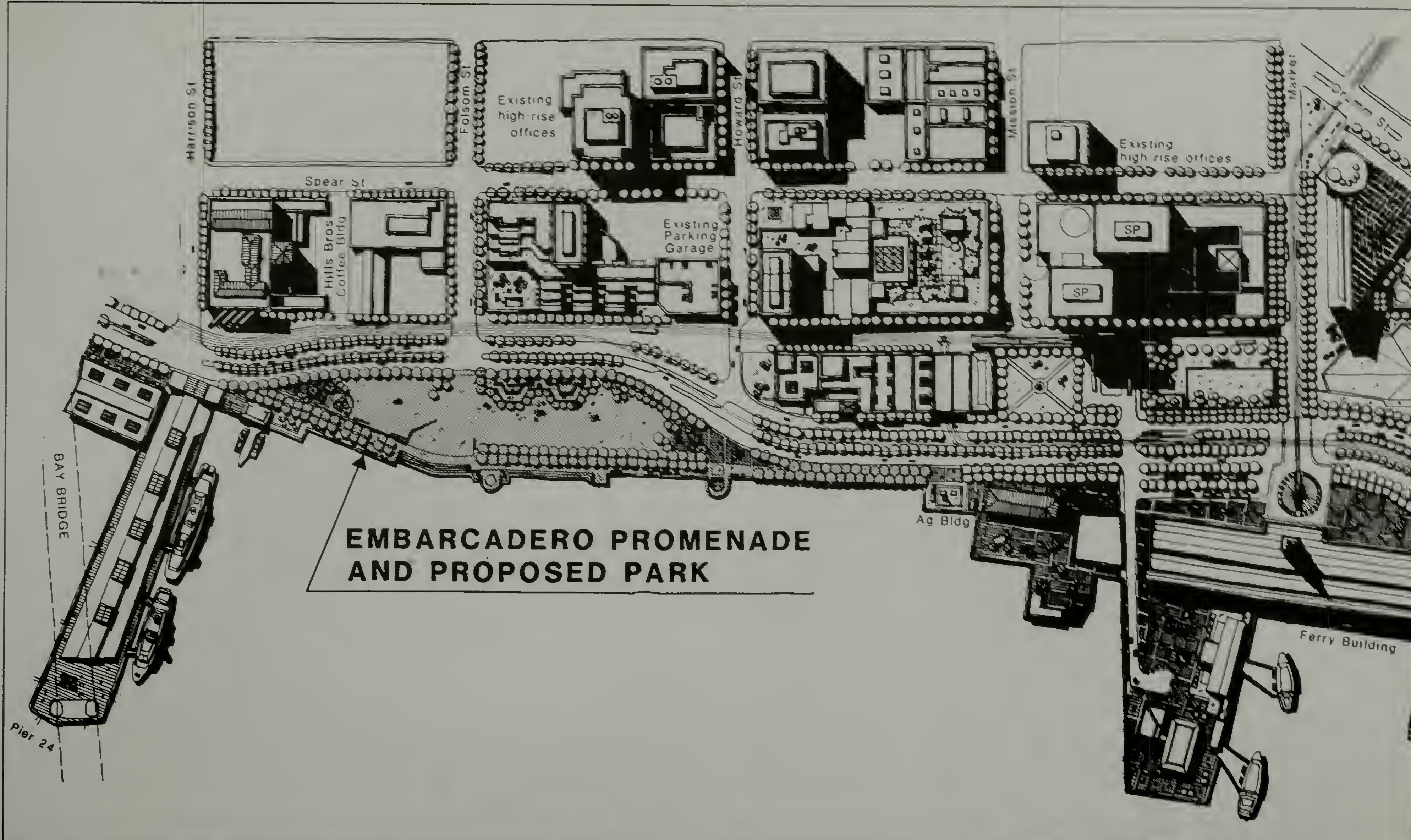
VI-5

The Embarcadero Promenade and proposed Park is a unique waterfront area because it represent a stronger linkage to the Bay's open water than other open spaces in the Northeastern Waterfront such as Justin Herman Plaza. The Promenade makes the water edge visible and physically accessible to the public since it is at-grade with the Embarcadero and does not introduce design elements which obscure views. The future landscaped park would enhance the close experience to open water as well as maintain the recently created views of the Bay Bridge and the Ferry Building. It is assumed that the future Rincon Point Park would be designed to add diversity and varied recreation experiences to the existing Promenade. A restaurant project in the inland park area is proposed. Preliminary sketch studies for the restaurant between the foot of Folsom and the foot of Howard Streets show that the area could accommodate a restaurant of approximately 10,000 gross square feet and surface parking for up to 100 cars.

The Embarcadero Promenade location near the downtown office core and its inviting visibility makes it a highly popular area for various recreational uses. Primary activities include jogging, sunbathing, bicycling, fishing and strolling. Usage counts are not available but the Promenade is actively used at lunchtime.

d. Proposed South Beach Park

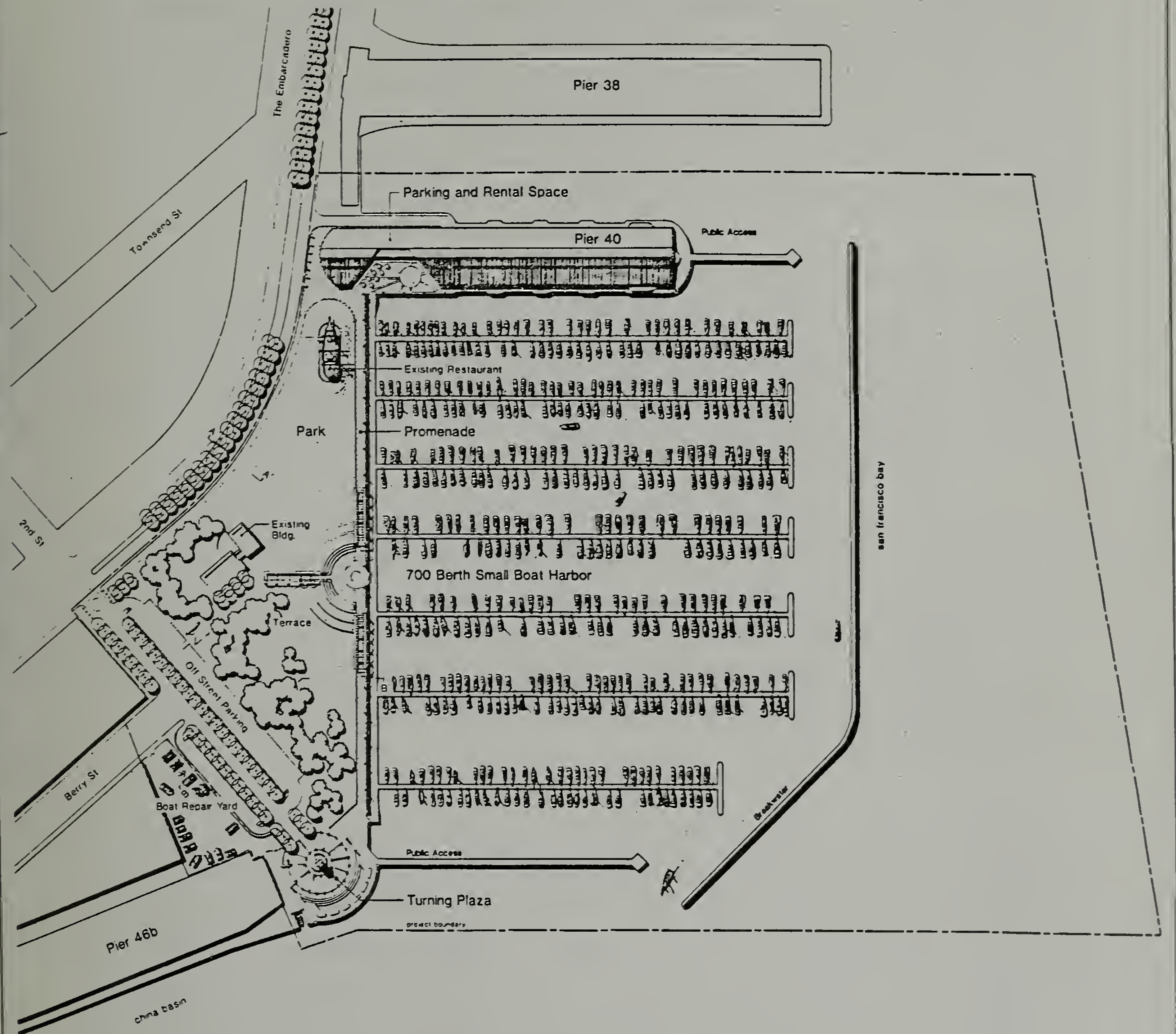
The San Francisco Redevelopment Agency's Rincon Point/South Beach Redevelopment Plan and the City's Northeastern Waterfront Plan contain plans for a proposed park in the South Beach area near Pier 40. This park would provide approximately five to seven acres of predominately landscaped space for public recreational use, with areas for active sports and separate areas for passive activities (see Figure VI-7).[9] A 20-foot wide pedestrian promenade would be provided along the park's waterfront edge, featuring views to a proposed 700-berth small boat harbor and the Bay. The park and boat harbor would serve as a key passive and active recreational facility for proposed residential and commercial development in the area. Under the proposed plan, the existing restaurant at the foot of Berry Street would remain, but all other structures on the site, and the Belt Line tracks, would be removed. The proposed park would involve realignment of the Embarcadero Roadway; closure of Berry Street east of Second Street; and, the termination of Second Street in a turning plaza at China Basin.



EMBARCADERO PROMENADE AND PROPOSED PARK (Conceptual Drawing)

VI-6

SOURCE: NORTHEASTERN WATERFRONT PLAN, SAN FRANCISCO DEPARTMENT OF CITY PLANNING, 1980



MASTER PLAN FOR PROPOSED SOUTH BEACH SMALL BOAT HARBOR AND PARK

SCALE 0 120 240 480 FEET

VI-7

SOURCE: SAN FRANCISCO REDEVELOPMENT AGENCY

2. Effects of I-280 Transfer Concept Program Alternatives on Open Space and Parklands

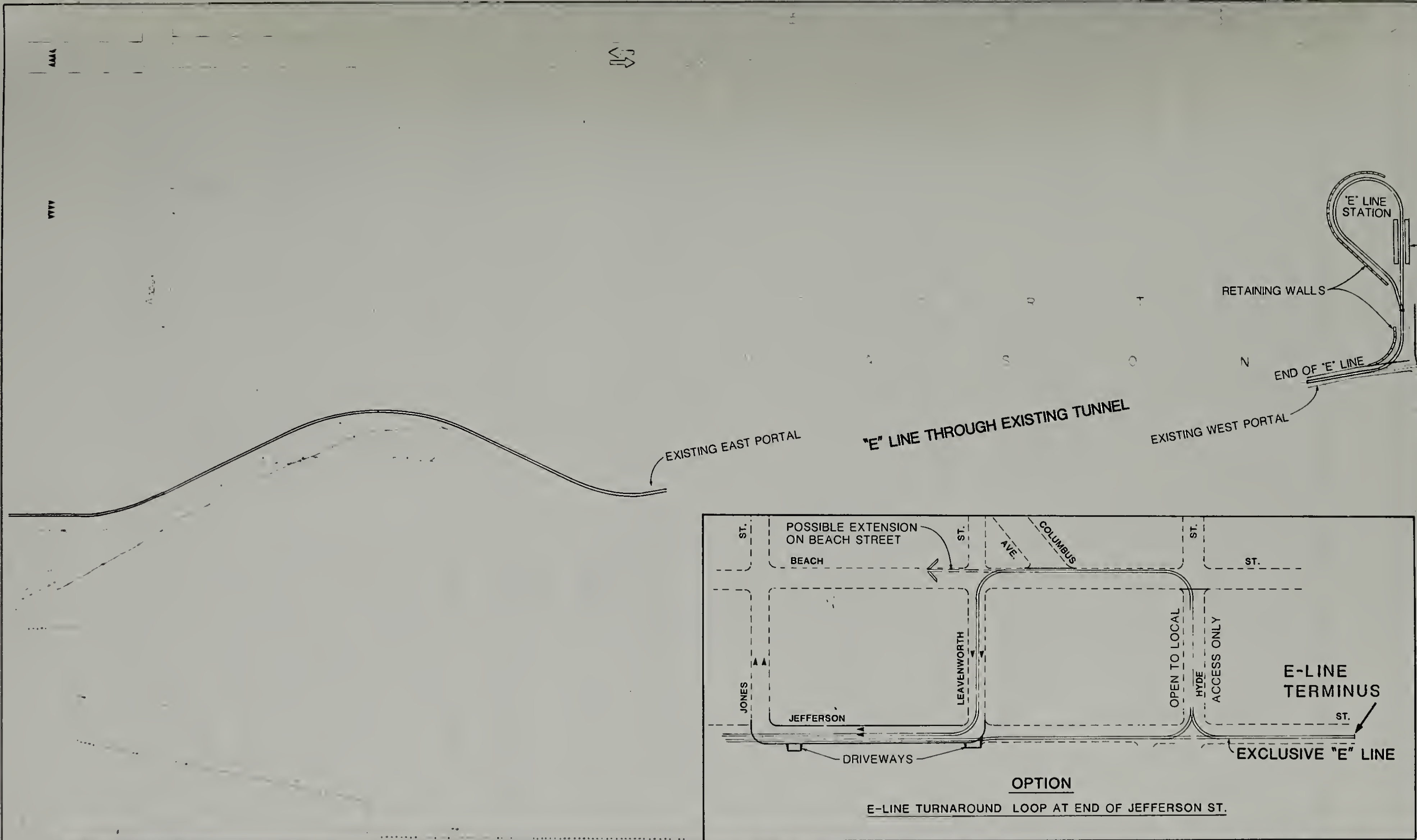
Significant recreational and historic sites within the Area of Potential Environmental Impact for each alternative have been previously described. This discussion identifies both direct and indirect effects on parklands and recreational areas of each alternative to the extent possible at this stage of analysis. If any alternative other than Alternative I, the No Project Alternative, is selected, the proposed project will result in a net increase ranging from four to six acres of public parkland in the study area.

a. Aquatic Park and Fort Mason

Alternative I, the No Project Alternative, would not involve any transportation improvements in this area and there would be no direct or indirect impacts. However, this alternative would not respond to objectives in the GGNRA General Management Plan for improved transit access to and within the parks.

Alternative II, with one exception, would not result in the use of land in the Aquatic Park/Fort Mason area since this alternative would feature buses on existing streets outside the parks. The exception would be a bus layover/turnaround area in an existing parking lot near the west gate of Fort Mason. This alternative would improve transit access to Aquatic Park and Fort Mason. However, it would not respond to the Park Service's stated objective to implement transit service within the parks utilizing the existing railroad right-of-way.

In Alternatives III-VI, the proposed Muni E-Line would utilize the existing Belt Line railroad route through Aquatic Park and the tunnel in Fort Mason to a turnaround to be constructed just south of the existing west portal near Laguna Street (see Figure VI-8). For operational flexibility, Muni has suggested adding a siding for the single track segment through Aquatic Park. Previous design studies have concluded that implementation of this concept would increase the use of this parkland. The tracks through Aquatic Park and Fort Mason would be used by regularly scheduled Muni trolley street cars. Stops would be located at Hyde Street and at the Fort Mason terminus. It is assumed that service would be from 6 a.m. to midnight, with 7.5-minute headway during peak periods and 10-minute headway during base and evening periods, on weekdays and weekends. Capacity of each E-line vehicle is estimated to be 100, including standees.



PROPOSED E-LINE ROUTE THROUGH AQUATIC PARK/FORT MASON

VI-8

Impacts of running the E-line through Aquatic Park would be primarily related to visual and safety issues. Visual impacts would involve the installation of overhead electric supply wires and side support poles. The addition of streetcars and electrification equipment would alter the existing character of this waterfront although there is historic precedent for the use of rail vehicles in the park. However, more specific visual characteristics of the E-Line, such as the number and location of support poles, cannot be assessed until more specific designs are prepared. It should be noted, however, that an Environmental Assessment of the Golden Gate National Recreation Area (GGNRA) Golden Gate/Point Reyes General Management Plan found the concept of E-line service through Aquatic Park to have no significant adverse environmental impacts.

Safety of pedestrians in the park would be a concern due to the location of intensively used recreation facilities adjacent to an at-grade transit corridor. Sight distances and visibility are good in this area, reducing the chance of conflicts between E-line operation through Aquatic Park and pedestrian circulation. In order to avoid the need for a grade separation or physical barriers, such as fences, between pedestrians in the park and the transit route, Muni would reduce speeds to 5 m.p.h. while in Aquatic Park, ring trolley car bells and post signs to warn pedestrians of approaching vehicles. The use of different types of paving materials on either side of the tracks to further mark them for pedestrians may be considered as well. Victoria Park and California, Market, and Powell Streets are examples of other areas in the City where design techniques have been used to avoid pedestrian and rail-transit conflicts.

In these alternatives the E-Line would be in conformance with the Park Service's management goals as well as the City's goals for improved transit access to Aquatic Park and Fort Mason. In addition, the possible use of historic vehicles would be particularly appropriate, given the recreational and historic nature of resources in this area.

The proposed E-Line turnaround in Alternatives III-VI would have a terminous and loop turnaround in Fort Mason. Throughout the I-280 study, plans have been developed to accommodate historic trolley cars which would be single-ended, right-loading-only vehicles. The turnaround site plan shown in Figure VI-8 is the preferred one of several studied since it minimizes the amount of park area required. The turnaround would be located in a side hill of the park just south of the portal and east of Laguna Street. The tracks would form a loop with a 75-foot radius and a two-car platform would be provided.

Since the turnaround site must be relatively flat, it would require a cut into the hillside and construction of a retaining wall to support the hill; the entire turnaround site would be paved. The only existing facility required to be demolished would be the south wall of the existing portal transition area. The turnaround would alter the existing character of the hillside in Fort Mason and it would reduce overall park area by 35,000 square feet, or .82 acres.

b. Justin Herman Plaza

Alternative I, the No Project Alternative, would not involve any transportation improvements in the Justin Herman Plaza and there would be no significant direct or indirect impacts. Alternatives III - VA create significant long-term beneficial impacts to Justin Herman Plaza from the Embarcadero Freeway removal since visual coherence would be enhanced along the Embarcadero and a visual link from the Market Street view corridor to the Ferry Building would be restored. The freeway removal would also noticeably reduce existing noise levels throughout the entire length of the Plaza. However, freeway demolition would have temporary indirect adverse effects from access restrictions and increased noise.

Alternatives II, III, V, VA and VI would result in temporary noise intrusion and disruption during the construction of the proposed Muni Metro subway turnback under Steuart Street at Market. The turnback would not directly impact Justin Herman Plaza since it would be located west of the Plaza and outside its boundaries. However, the construction could potentially restrict pedestrian access from Market Street to the Plaza, and could temporarily impact some of the pedestrian-oriented activities in the Plaza, including street artists.

In Alternatives IV and IVA the Muni Metro subway turnback under Steuart Street would be expanded to include a turnaround loop beneath Justin Herman Plaza and the Embarcadero. The impacts would all occur during a 9-12 month construction period. Impacts would include restrictions on pedestrian access to and through the Plaza and a significant reduction in an elimination of recreational uses in subarea B.

Alternatives IV, V, VA and VI feature a proposed E-Line and F-Line connection at the Embarcadero and Ferry Building. The F-Line trolley would cross a portion of Justin Herman Plaza, subarea B. Historically, there is precedent for the use of this area for

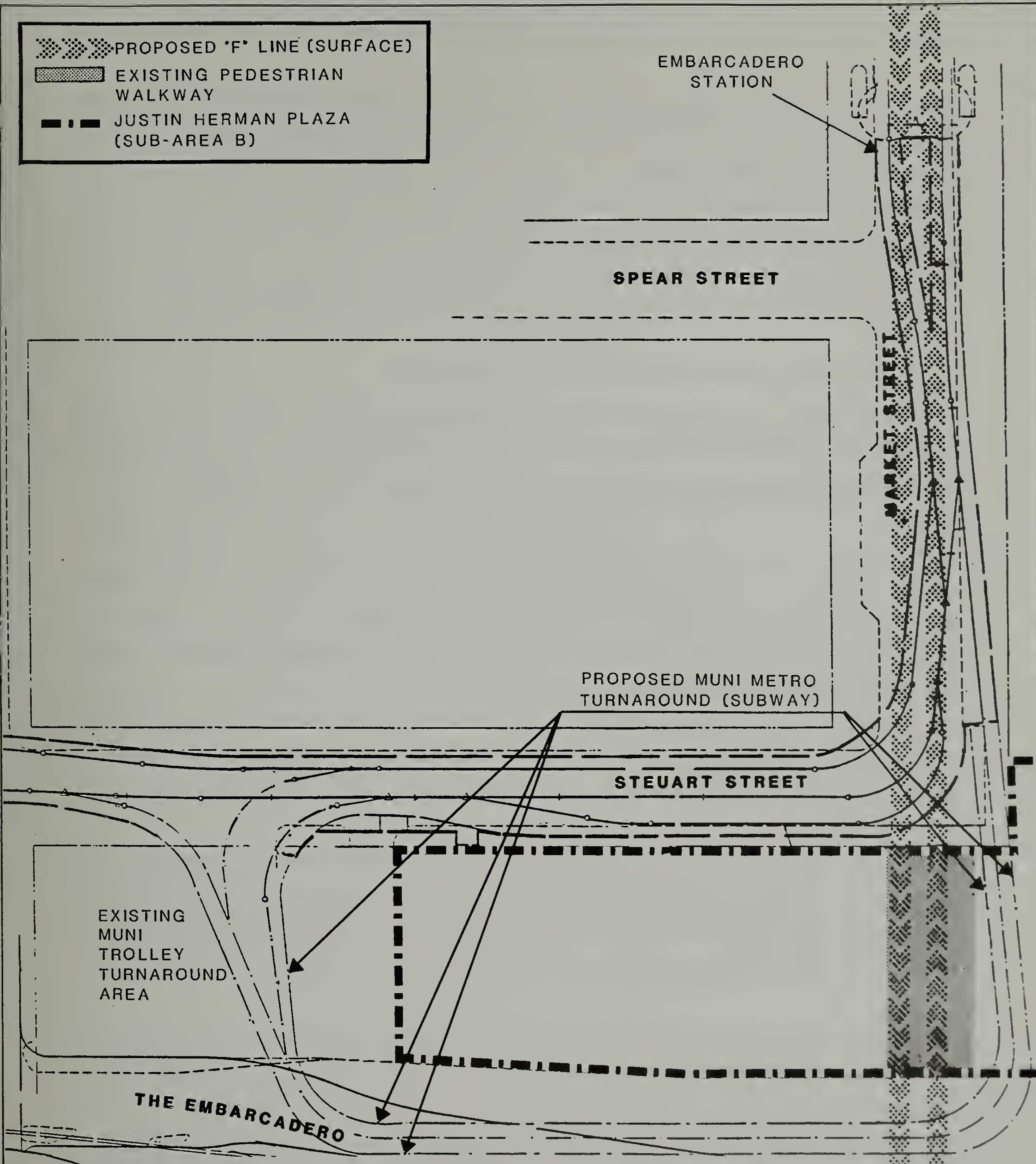
transit since the area in front of the Ferry Building was originally designed as a point of interchange for all the major transit lines in the City. While there is historic precedent for such a connection in front of the Ferry Building, the new transit line would result in the permanent loss of parkland created when Justin Herman Plaza was formed and Market Street was vacated at this location. The proposed at-grade F-Line service would restrict pedestrian access and would conflict with the continued use of the exclusive pedestrian walkway across the Plaza from Market Street to the Embarcadero roadway (see Figure VI-9). The location of the line could also have a direct impact on some recreational activities in subareas A and B and would require redefining the permitted areas for the street artists.

Alternative IVA features the E-Line and F-Line interface in the Embarcadero, but the F-Line would not cross Justin Herman Plaza; rather, the line would run through Steuart Street into the existing Muni surface trolley bus turnaround. Therefore, it would not result in any significant direct or indirect impacts on the Plaza.

Alternative IVA also includes three design options for pedestrian crossing from the Ferry Building to the Justin Herman Plaza, subarea B. One of these design options includes an elevated pedestrian bridge which would extend across the Embarcadero Roadway to either the eastern edge of Justin Herman Plaza or across the plaza to an excalator near the intersection of Market and Steuart Streets. The longer bridge option, which extends to Steuart Street, would have an impact on existing recreational uses at Justin Herman Plaza, and require a permanent taking of a small area of the parkland.

Alternative IVA also includes three design options for Muni trolley bus turnaround extension to the Ferry Building area. None of these options would affect Justin Herman Plaza.

Significant impacts on Justin Herman Plaza can be summarized as follows: Alternative I, none; Alternative II, indirect construction impacts from Muni Metro subway turnback construction; Alternative III, indirect short-term impacts from Muni Metro subway turnback construction, and permanent beneficial impacts from freeway removal; Alternative IV, permanent beneficial impacts from freeway removal, permanent adverse impacts from the F-Line across the Plaza, and temporary construction impacts from Muni Metro subway turnaround loop; Alternative IVA, permanent beneficial impacts from freeway



ALTERNATIVE IV: JUSTIN HERMAN PLAZA WITH PROPOSED "F" LINE ROUTE

NO SCALE

VI-9

removal, temporary construction impacts from the Muni Metro subway turnaround loops, and potential permanent adverse effects from design options for pedestrian crossings; Alternative V, indirect short-term impacts from Muni Metro subway turnback construction; permanent beneficial impacts from freeway removal, and permanent adverse impacts from the F-Line across the Plaza; Alternative VA, same as Alternative V; and Alternative VI, indirect short-term effects from Muni Metro subway turnback construction, and permanent adverse impacts from the F-Line across the Plaza.

c. **Proposed Rincon Point Park and Existing Promenade.**

Alternative I, the No Project Alternative, is inconsistent with the assumption that the Embarcadero Roadway would be realigned to create the park. Land for the proposed park would not be made available under this Transfer Concept Program alternative.

Alternative II would result in the realignment of the Embarcadero roadway along the western edge of the proposed park, relocation of the Belt line in the Embarcadero roadway, and a shared E-Line bus in the Embarcadero roadway. The reconstruction of the Embarcadero roadway in the Rincon Point Park area north of Harrison Street to Howard would alter the character of the waterfront edge in a positive way. The alignment would not reduce the existing Promenade nor limit recreational uses for the proposed Rincon Point Park. Alternative II would permit a Park, including the Promenade, with the greatest usable area of all the alternatives, approximately 6.2 acres.

Alternative III would have similar positive impacts resulting from improvements to the Embarcadero roadway as discussed with Alternative II. In addition, the Promenade would benefit from the removal of the elevated Embarcadero Freeway by expanding views inland from the Promenade and possibly improving its noise environment.

Allowing for the relocated Belt line along the park's boundaries and the shared Muni Metro/E-Line along Steuart Street, Alternative III create a Park and Promenade area totaling 5.5 acres.

The impact upon the proposed Rincon Park and the Promenade for Alternative IV would be similar to Alternative III, but the realignment of the Embarcadero roadway with five lanes would reduce the amount of parkland area created to 5.05 acres.

Alternative IVA features a variable lane Embarcadero roadway (four lanes in the Park area) with the Belt line running in the median. The Belt line would not be adjacent to the Park's boundaries but rather in the median. A new retaining wall would be built for the roadway and freeway on-ramp extending from either side of Howard Street on the eastern Embarcadero side. The new wall would run approximately on the northwestern edge of the proposed park. Total acreage for the proposed Rincon Point Park and the Promenade would be approximately 5.17 acres, and like Alternative III and IV, it would benefit from freeway removal.

Atlernatives V and VA feature a six-lane Embarcadero Roadway along the entire Rincon Point Park. These alternatives would leave 4.9 acres usable for the Rincon Point Park and the Promenade, the smallest acreage in comparison to other alternatives. The relocated Belt line would run along the western edge of the park. These alternatives would also benefit from freeway removal.

Alternative VI would include the Embarcadero roadway alignment for four lanes, but would retain the Embarcadero Freeway only. The last portion of the elevated freeway would be removed in the area next to the northern end of the Promenade, with some resultant beneficial impacts on views from the northern end of the Promenade and proposed Park. However, this alternative would leave 5.4 acres usable for the Rincon Park and Promenade, one of the alternatives with the largest amount of acreage.

d. Proposed South Beach Park

Alternative I, the No Project Alternative, would have a negative impact on this proposed park since the Embarcadero Roadway would not be realigned as assumed by plans for the park and land for the park would not be created by the realignment.

Alternative II and III would realign the Embarcadero Roadway to along the proposed northern boundary of the park. Alternatives II and III differ from the plans for the park in that both alternatives would retain the existing Belt Line tracks through the park. However, this is not considered a significant intrusion for two reasons: first, the Belt Line is infrequently used and only late at night when few if any people would be using the park; second, the Master Plan Report for the park acknowledges that the tracks could be incorporated into the park's design with minimum visual impact.[10] Alternatives IV and IVA would realign the Embarcadero Roadway to just inside the park's proposed northern

boundary, relocate the Belt Line to the inland side of the Embarcadero Roadway, and reconstruct Second Street with a turning plaza at China Basin, in conformance with the Redevelopment Agency's plan and the City's Northeastern Waterfront Plan. The Embarcadero Roadway would be wider in these alternatives in order to accommodate the E-Line and the Belt Line. The roadway would reduce the park's landscaped area by about 8,750 square feet (.2 acres), or an approximate 20-foot wide strip along its northern boundary (see Figure VI-10). In contrast to Alternatives II and III, Alternatives IV and IVA would relocate the Belt Line to outside the park boundaries; this would be consistent with the plans to remove the tracks from the park.

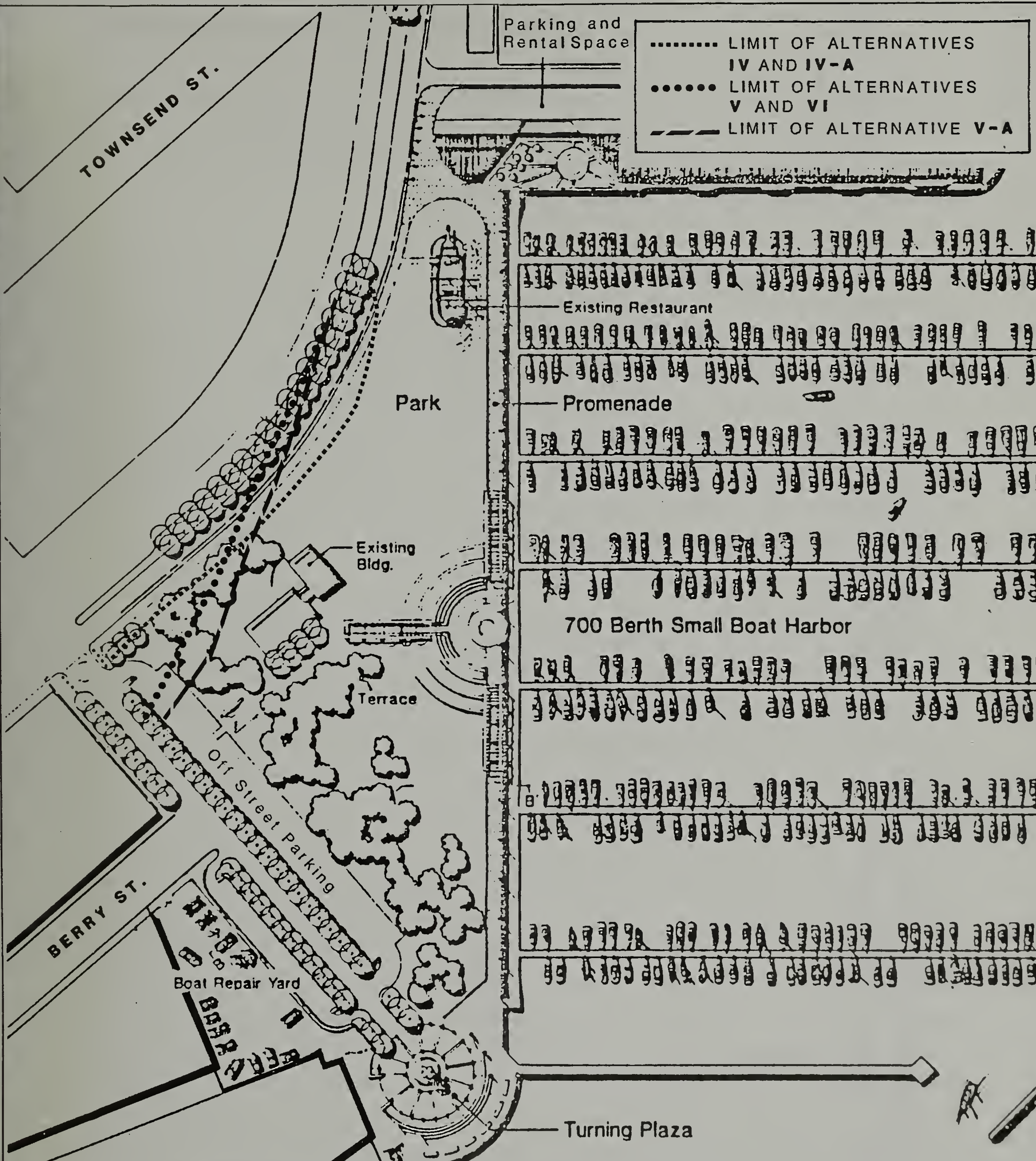
Alternatives V and VI would reduce the potential park area by about 10,600 square feet (.24 acres) in order to align the Embarcadero Roadway to meet the proposed I-280 on- and off-ramps which would touch down at Second Street. The roadway alignment would not interfere with any park structures, but it would slightly reduce the size of the proposed parking lot, while the nearby proposed freeway ramps would present both audio and visual intrusions to the park. Both the proposed freeway ramps and the six-foot high soundways for the SP route, inland of the Embarcadero Roadway, would restrict views to and from the park.

Alternative VA would reduce park area by approximately 18,100 square feet (.42 acres). This alternative would encroach more on the park than Alternatives V and VI because it would widen the Embarcadero Roadway in order to keep King Street open to traffic. As with Alternatives IV-IVA, V and VI, the Belt Line would be relocated to lie outside the proposed park boundary. The proposed I-280 Freeway touchdown ramps would block some views to and from areas west of the park, however, the SP extension would be below grade and would not obstruct views as in Alternatives V and VI.

3. <u>Mitigation Measures</u>

a. Aquatic Park and Fort Mason

Alternatives I and II do not propose a Muni E-Line route through Aquatic Park/Fort Mason and would avoid the impacts associated with the streetcars and turnaround in these parks. In Alternatives III-VI, impacts of the Muni E-line on Aquatic Park and Fort Mason could be mitigated by an optional E-line route which would involve a single-track turnaround loop along Hyde Street to Beach Street and back to Leavenworth Street (see insert to Figure VI-7). A single storage track would be connected so as to form a 'y' with the Hyde



IMPACTS OF I-280 ALTERNATIVES ON PROPOSED PARK

SCALE 0 60 120 240 FEET

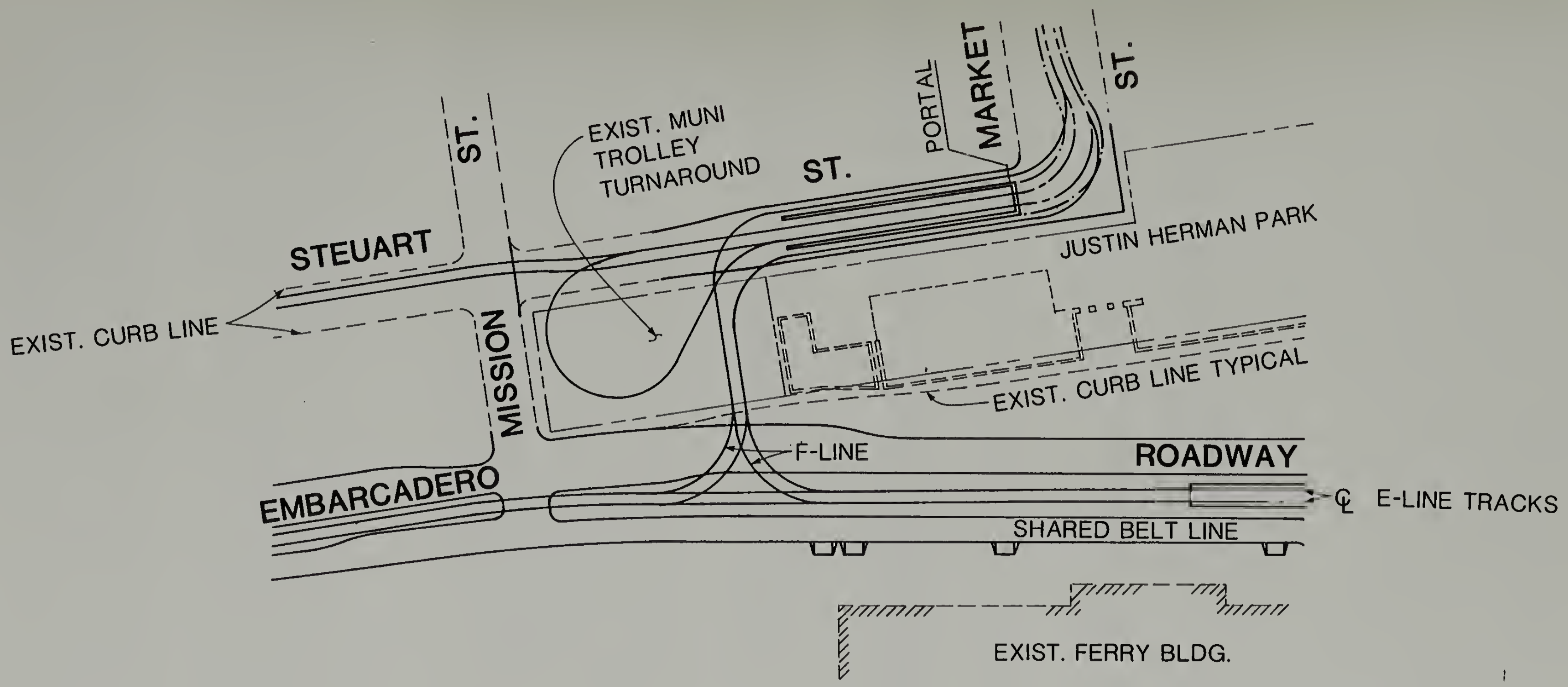
VI-10

Street track, terminating in front of the Swimming and Rowing Clubs in Aquatic Park. This option would eliminate most impacts in Aquatic Park, but it would not provide E-line service to Fort Mason and it would not respond to GGNRA objectives to reinstate transit rail service along the existing tracks in these parks.

To mitigate impacts of the Muni E-line turnaround in Fort Mason, double-ended and two-sided cars could be used. This would eliminate the turnaround loop requirement and make it possible to install only a short second track with a turnout parallel to the south side of the existing track which ends at Laguna Street. A station platform could be located parallel to and south of the second track. While this option would eliminate impacts of the turnaround loop, it would preclude the use of historic streetcars which are preferred by the Park Service and the City. Impacts of the turnaround loop could also be mitigated by incorporating landscaping and more active use of the area between the tracks so that the area would not be left wholly unusable as parkland.

b. Justin Herman Plaza

The impacts in IVA of constructing the full subway turnaround loop facility under Justin Herman Plaza, Subarea B, and the existing Muni trolley turnaround area, could be mitigated by phasing construction and placement of street decking, particularly in Subarea B. Construction scheduling could take place in three phases; the subway leg between the intersection of Market/Steuart Streets and the Embarcadero could be one phase. The actual subway corridor would not be large but the disruption from noise and dust would require street artists to relocate further into the Plaza, Subarea A, or to another location. Relocation would require amending the existing permits following coordination with the street artists, Recreation and Parks Department, Embarcadero Center and the Art Commission. The second phase would take in the Embarcadero side of the subway loops. The existing pedestrian walkway in Subarea B would be obstructed to pedestrians crossing to and from the Embarcadero. The obstruction could be mitigated by opening the landscaped berm immediately north of the walkway. This would provide direct access to Justin Herman Plaza. It could be restored once construction is completed. The third and final phase of the subway loop under the Mission Street boundary of the Plaza would disrupt temporarily the existing Muni trolley bus turnaround. Each phase of construction would take approximately three to four months.



MITIGATION: MUNI METRO SURFACE LOOP TURNAROUND (ALTERNATIVES IV AND IV-A)

SCALE 0 40 80 160 FEET

SOURCE: PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

VI-11

A design option to the full subway system in Alternative IVA would be the construction of a Muni Metro subway portal at the intersection of Mission Street and Steuart (see Figure VI-11). At this point, the Muni Metro cars would surface and could access turnaround facilities which would be constructed within the bounds of the existing Muni Trolley Bus turnarounds. The F-Line would run at-grade along the portal and pass through the existing turnaround to intersect with the E-Line near the Ferry Building. The long-term impact of this scheme would be different from other subway proposals in Steuart Street since the portal would significantly obstruct pedestrian crossing at the intersection between Steuart and the Plaza. In addition this option would have several undesireable operating characteristics. It would require three Muni Metro/F-Line crossings, it would utilize the entire Muni Trolley turnaround area and it would not provide any temporary storage track for Muni Metro cars.

---

[1] Specifically, Section 4(f) requires that the Secretary of Transportation shall not approve any program or project which requires the use of publicly owned land from a public park or recreation area or any land from an historic site of federal, state, or local significance unless:

a. there is no feasible and prudent alternative to the use of such land; and
b. all possible planning to minimize such harm has been undertaken.

If a preferred alternative is selected which would involve the use of Department of Transportation funding and any of those resources which are publicly or privately owned, a Section 4(f) Statement describing in detail the effects on these resources, the planning effort to minimize harm to such resources, and assessing feasible and prudent alternatives to the proposed action will have to be incorporated into an Environmental Impact Statement (EIS) prepared pursuant to National Environmental Policy Act (NEPA) guidelines. Furthermore, if the preferred alternative would adversely affect a resource listed on or determined eligible for the National Register, Determinations of Effect and Preliminary Case Reports will have to be prepared in accordance with the Historic Preservation Act.

[2] The Historic Properties Survey Report consisted of: an Archaeological Resource Evaluation by David Chavez and Lawrence Shoup; an archaeological addendum by Mara Melandry, Caltrans; a Historic Architectural Survey by John Snyder, Caltrans; an evaluation of the Belt Line Railway by Roger and Nancy Olmsted, and updated by Mara Melandry; and an evaluation of the San Francisco-Oakland Bay Bridge by John Snyder.

[3] In those areas where new transit lines are proposed where none currently exist, adjacent properties were included due to the visual and audible intrusion such new lines may cause. In areas where noise levels are already high and new transit lines are proposed in addition to those already in operation, as in the Fisherman's Wharf area, the area of impact was agreed to extend from curb to curb; no buildings were to be studied. In

those portions of the project where the various alternatives involve either transit or roadway improvements to the Embarcadero roadway, all of which would take place within existing right-of-way, the area of impact also extends from curb to curb. Several alternatives involve demolition of the Embarcadero Freeway; because of the substantial change in the environmental setting its removal would involve for nearby structures, the first row of buildings on both sides of the Embarcadero Freeway was included in the area of impact.

[4] 36 CFR 800.3

[5] National Park Service, Golden Gate National Recreation Area, Assessment of Alternatives for the General Management Plan, May 1977, page 89.

[6] National Park Service, Golden Gate National Recreation Area, General Management Plan Environmental Analysis, September 1980, page 71.

[7] San Francisco Department of City Planning, Northeastern Waterfront Plan, adopted by Resolution 7643 of the City Planning Commission, January 19, 1977, page 56.

[8] San Francisco Department of City Planning, Transportation Element, adopted by Resolution 6834 of the San Francisco City Planning Commission, April 27, 1972, page 20.

[9] San Francisco Redevelopment Agency, South Beach Small Boat Harbor and Park Master Plan Report, October 1982, page 4.

[10] Ibid., page 30.

VII. SUMMARY OF MAJOR ISSUES

INTRODUCTION

This chapter provides a summary of the major issues posed by the I-280 Transfer Concept Program. Some of these issues have been discussed in detail in earlier chapters of this report, specifically the discussion of impacts and mitigation measures presented in Chapters V and VI.

A summary of major impacts and mitigation measures is followed by a discussion of the relationship between the short-term use of the environment and long-term productivity, as well as I-280 TCP resource commitments. The last section is a discussion of the institutional issues which must be considered in any decision on the I-280 TCP.

A. SUMMARY OF MAJOR UNAVOIDABLE ADVERSE IMPACTS AND MITIGATION MEASURES

This section describes significant environmental effects caused by the eight alternatives, during both the construction and operating phases. In some cases, suggested mitigation measures can be incorporated into facility planning and design to reduce adverse impacts to acceptable levels. Adverse impacts that can be reduced but not eliminated are unavoidable.

1. Construction Phase

- Construction of various elements for all alternatives would cause some disruption to local businesses and residential uses, due to noise, increases in dust and other particulates, and vehicular and pedestrian traffic diversion. Although unavoidable, these disruptions would be temporary. Construction impacts would occur particularly in areas with heavy construction activity and nearby sensitive uses. Such impacted areas include the Ferry Building segment (e.g. the Ferry Building, Justin Herman Plaza, and the East Row), for residential and commercial uses adjacent to the Embarcadero Freeway and the Broadway and Washington Street ramps in the Embarcadero Freeway removal alternatives (III-VA), and the Fisherman's Wharf area in Alternatives III-VI during construction of the Muni E-Line.

The greatest construction impacts would occur with implementation of Alternatives VA, due largely to the Embarcadero Freeway removal and undergrounding of the Peninsula Commute Service extension along its entire length. The Alternative VA construction period is longer than any other alternative, and involves more excavation work than other alternatives. The noise, energy consumption, and other construction impacts of Alternative VA can be mitigated by selection of other alternatives, or the adoption of the mitigation measures discussed in Section V.F.9 if Alternative VA is selected for implementation..

The mitigation measures discussed in Section V.F.9 would reduce the extent of construction impacts. Such measures include careful scheduling of construction activity and traffic detouring, and construction procedures such as dust suppression, vehicular muffling and screening off construction areas.

- Removal of vegetation would be required in the Embarcadero Plaza area in Alternatives III-VA while the Embarcadero Freeway is dismantled. No endangered species would be affected. Vegetation would be replanted after construction is complete.

- Energy in various forms would be required for the construction of the various alternatives. Construction energy requirements would range from 2.5 million barrels of oil (Alternative VA) to .37 million barrels of oil (Alternative II). Energy consumption is only mitigable if no construction is undertaken (i.e., if Alternative I is selected).

- Construction of the Muni Metro Turnaround in Alternatives IV and IVA would require temporary disruption to Justin Herman Plaza. For Alternative IVA several design options for at-grade Muni Metro turnarounds are proposed to mitigate this impact. These at-grade options would have long-term adverse impacts on traffic, and are considered entirely mitigable.

2. Operational Phase

- Noise would increase under several alternatives. The most significant increase would be in Alternatives V and VI along the at-grade PCS extension route. Though this impact would not be significant for existing uses, proposed residential areas, such as the Rincon Point/South Beach Redevelopment area, would be adversely impacted. The proposed 6-foot-high noise barrier would not significantly reduce noise levels. If selected, the impacts of these alternatives are not considered mitigable. Selection of other alternatives constitutes a major mitigation measure. Under Alternatives III through VI, minor interference with activities in the Aquatic Park area would be expected during LRV passbys. In Alternative II a new noise source from the E-Line bus would be introduced to Bay Street between Van Ness Avenue and Laguna Street. Selection of other alternatives will mitigate the impacts associated with Alternatives II and III-VI.

- No residences would be displaced for any alternative except for Alternative I. However, all alternatives would result in displacement of businesses. Business displacement would vary depending on the alternatives as follows: Alternative VA, 73 businesses; Alternative V, 22 businesses; Alternative VI, 20 businesses; Alternative IV, 12 businesses; Alternative IVA, 11 businesses; Alternatives II and III, 9 businesses; and Alternative I, no businesses. Selection of Alternatives I and VA (which includes joint development opportunities) are the only alternatives which mitigate business displacement impacts.

- Change of visual quality along the at-grade PCS extension from the 6-foot sound barrier wall (Alternatives V and VI) is considered a major adverse impact. All other alternatives mitigate this impact. In particular, Alternative VA mitigates this impact by retaining the PCS extension as a design component, but undergrounding it along its entire length. The above-grade pedestrian crossing design options of Alternative IVA would have an adverse visual impact on the Ferry Building/Justin Herman Plaza and the Fourth and Townsend SP Depot areas. Views would be affected from the street level and second-story windows along the project corridor. This impact can be mitigated by use of an underground crossing -- also an Alternative IVA design option -- or an at-grade crossing.

- Energy, in the form of electricity and fossil fuels, would be required for the operation of public transit facilities. However, compared to Alternative I (the No Project Alternative), a net decrease in consumption of operational energy would occur for Alternatives III-VI. Selection of Alternatives III-VI thus mitigates the operational energy consumption of the 'do-nothing' alternative.

- Though all alternatives would result in an overall improvement to regional air quality as compared to existing conditions and though no Federal air quality standards would be exeeded, the state 8-hour average Carbon Monoxide standard would be exceeded by all alternatives. While conformance with the standard is not possible, selection of Alternatives I, III, IV, and VA mitigates the impacts of the other alternatives.

- Removal of the Embarcadero Freeway (Alternatives III-VA) would increase peak period congestion on surface streets in the Embarcadero Corridor. The extent of congestion for each alternative varies depending upon the extent of mitigating traffic improvements (e.g. new ramps to the Embarcadero roadway). Street congestion would also affect transit operations. Impacts on surface street performance would be largest for Alternative III, followed by Alternative IV. Alternatives IVA, V and VA would all have similar street performances, and would mitigate the impacts of Alternatives III and IV.

- Increased interface between rail (E-Line, F-Line, Peninsula Commute Service extension) and non-rail vehicles in Alternatives III-VI would adversely affect traffic flow along the Embarcadero roadway and occasionally reduce traffic speed. These impacts are unavoidable.

- Alternatives III, V, and VA would adversely impact existing Muni Metro subway capacity levels, due to the combination of the Muni Metro extension and the turnback facility. Selection of other alternatives would actually enhance subway capacity. Alternatives IV and IVA provide the greatest expansion in capacity.

- Parking spaces would be lost throughout the project corridor. Number of parking spaces lost would range from 80 spaces in Alternative I to 1,650 spaces in Alternative IVA. While loss of spaces is unavoidable, varying degrees of mitigation can be achieved through selection of an alternative.

- Historical resources would be both visually and physically affected (see Chapter VI). Direct, physical impacts on historic structures would occur only in Alternative VA on the site of the downtown Peninsula Commute Service depot adjacent to the Transbay Terminal. Selection of other alternatives mitigates these impacts.

- While the exact nature and location of archaeological sites are unknown, there is a high probability that some archaeological resources could be affected. Impacts would likely occur during excavation for the Peninsula Commute Service or Muni Metro extensions. To insure protection of archaeological resources, an archaeologist will observe construction activity, and "time buffers" will be built into construction contracts to allow time for any archaeological salvage operations. Selection of Alternative I is the only measure that ensures absolute mitigation of advese impacts on archaeological resources.

B. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The construction phase of the I-280 Transfer Concept Program would result in several short-term adverse impacts. During construction of any proposed alternative, there would be increased fuel consumption, noise, dust, disruption of pedestrian flow and rerouting of vehicular traffic. Construction could temporarily disrupt individual businesses, particularly shops whose sales rely on window displays and walk-in trade. Such businesses are concentrated in the Fisherman's Wharf and Ferry Building segments. Commercial and industrial land would have to be acquired for different elements in each alternative. Depending on the alternative selected, between 73 businesses (Alternative VA, before joint development possibilities are considered) and 9 businesses (Alternatives II and III) would be displaced. Two buildings which may be eligible for listing on the National Register would have to be removed in Alternative VA for the downtown Peninsula Commute Service depot. In Alternatives IV-VI, construction of the Muni Metro turnaround and/or the F-Line would disrupt use of Justin Herman Plaza (see Chapter VI). Short-term beneficial impacts would result from increased employment and from the purchase of construction material.

The short-term uses of man's environment are a necessary trade-off in order to achieve the enhancement of long-term productivity. To varying degrees, each alternative contributes to the fulfillment of local and state goals and policies for land use and transportation planning and development in the corridor. Elements within the I-280 Transfer Concept Program can be identified as primarily roadway improvements (e.g. improvements to I-280, reconstruction of the Embarcadero roadway) or public transit improvements (e.g. E-Line, Peninsula Commute Service extension). Roadway improvements, especially reconstruction of the Embarcadero roadway, would improve traffic circulation in the project corridor. Removal of the Embarcadero Freeway, especially in Alternatives III and IV, would adversely affect traffic circulation in the project corridor. However, additional roadway improvements in Alternatives IVA-VA would significantly improve traffic circulation compared to Alternatives III and IV. Removing the Embarcadero Freeway would also improve the visual and noise environment in the Ferry Building segment.

All of the proposed transit improvements would help to improve either regional transit service to downtown San Francisco or local transit service in the project corridor. Improvements to local transit service would benefit commuters, local residents and tourists.

In addition to meeting immediate transportation and land use needs, elements of the I-280 Transfer Concept Program would benefit proposed uses in the project corridor, especially south of Market Street. More intensive office, residential and commercial uses are expected to replace existing warehouse and light industrial uses, thus changing the character and transportation needs of the area. Transit improvements are consistent with and would enhance the proposed land use changes. Other elements, such as the treatment of the I-280 Freeway in Alternatives IV and IVA, would free up land, thus allowing planned development. Therefore, the continued productive and orderly growth of the City and the region would be maintained or enhanced to varying degrees by the alternatives for the I-280 Transfer Concept Program.

C. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Certain types of resources, such as energy, land, capital, construction materials and labor, are irretrievable once committed to a use. The use of these resources is considered permanent but does not imply that they have been used unproductively, particularly if they contribute to the long-term productivity of man's environment.

Energy consumed during both construction and operation of any of the proposed alternatives is an irretrievable commitment of resources. Electrical energy and/or energy derived from fossil fuels would be consumed, and energy demand for construction would vary according to which alternative is selected.

Alternatives III-VI would consume less operational energy than Alternative I, the No Project Alternative. However, operational energy savings are insignificant when compared to construction energy requirements. For all alternatives, energy "pay back" periods would exceed 150 years.

The majority of the right-of-way required by the alternatives lies within existing rights-of-way. However, all the "build" alternatives require the acquisition of additional land. Relatively large amounts of land acquisition would be required for realignment of the Embarcadero roadway between Howard and Harrison Streets (Alternatives II-VI), the Peninsula Commute Service extension (Alternatives V-VI) and the treatment of I-280 in Alternatives V-VI. Once the transportation systems are constructed, the rights-of-way are considered irretrievably committed, although some mitigation would be possible in the joint development of land around transit stations. Also, partially or completely offsetting the acquisition of land would be the freeing of land for private development or parkland. All the "build" alternatives would free land for private development and/or proposed parkland, and for Alternatives II-IVA more land would be freed than would be acquired.

Capital required for construction is also irretrievably committed. Although large, the commitment generates increased employment opportunities, enhanced mobility, travel time benefits, and growth accommodation characteristics that potentially outweigh facility costs.

Irretrievably committed construction materials for any of the "build" alternatives include cement, concrete, aggregate, lumber, steel, landfill, etc. Much of this material can be obtained locally.

Design and construction of a transportation system creates a large but short-term demand for labor, and an irretrievable commitment of human resources. Labor requirements for operation and maintenance of the system also represent a long-term irretrievable commitment. Short-term and long-term employment opportunities created by facility development tend to countermand the irreversible nature of the resource commitment.

D. INSTITUTIONAL CONSIDERATIONS

1. Affected Government Agencies

The implementation of the I-280 TCP projects would be subject to governmental reviews for permitting and funding approvals before construction could begin. Unless noted otherwise, the government agency roles described here would apply to any of the alternatives. Depending upon the element and site location, more than one city department could be considered for designation as the lead agency. For instance, a bus-related TSM measure involving construction at an Embarcadero location could involve Muni, the Redevelopment Agency, the Department of Public Works and the Port of San Francisco. Depending on the circumstances, any one of these could be most appropriate for the lead agency role. Other agencies not described below, such as the Association of Bay Area Governments (ABAG), the Environmental Protection Agency, the Federal Railway Administration and the California Highway Patrol, would not issue permits or fund individual elements but would review and comment on the project during circulation of the EIR, and/or subsequent engineering work.

a. Federal Agencies

The Federal Highway Administration (FHWA) and Urban Mass Transportation Administration (UMTA) are both within the Department of Transportation (DOT), the federal agency responsible for transportation policies. Once a project is advanced for further development proposals for specific elements would be submitted to either FHWA or UMTA for environmental and project review, and necessary environmental documents prepared in accordance with National Environmental Policy Act guidelines. Highway plans, specifications, and estimates would be reviewed by the respective Division Offices in Sacramento and San Francisco. Upon issuance of federal agency approval, the project sponsor (e.g. Caltrans, Muni, Department of Public Works), would proceed with advertisement for and review of bids, and selection of a contractor. Construction review authorization is delegated by the federal agency to the project sponsor with the federal agency participating in the final inspection and approval.

Alternatives IV through VI all include bridge construction work within a navigable portion of China Basin and would thus require a permit from the U.S. Army Corps of Engineers pursuant to the Federal Clean Water Act. Other agencies, including the California Water Quality Control Board and the Department of Fish and Game, would have review authority over the issuance of such a permit.

b. State Agenices

Caltrans is the lead government agency for the preparation of the EIR for the I-280 Transfer Concept Program. For those elements in the Transfer Concept Program under Caltrans jurisdiction the project development process is outlined in the California Action Plan for Transportation Planning and Development. This process assures that social, economic and environmental effects are considered concurrently with engineering and technical aspects.

When privately owned railroad operations are affected, the State of California Public Utilities Commission (PUC) becomes involved as an administrative and regulatory agency. In Alternatives V, VA and VI, Caltrans, as managing contractor for the Peninsula Commute Service would submit an application to the PUC for extending the Peninsula Commute Service rail line to downtown San Francisco. The State PUC would also be responsible for regulating alterations to the Belt-Line railroad, which is owned and operated by the Port of San Francisco. Any element involving a new or altered railroad or highway crossing would also require authorization from the PUC as set forth in Rules 38 and 17.1, respectively, of the Commission's Rules of Practice and Procedure (Title 20 of the California Administrative Code). In the application process, if there are no objections, the Commission grants the application. If there are objections, the Commission would review the nature and number of complaints and would hold public hearings before granting an application. The State PUC also oversees the safety of passenger vehicles and equipment design, and would therefore review the proposed designs for the Peninsula Commute Service line.

c. Regional Agencies

The MTC, Caltrans and the City are represented on the Policy Control Committee (PCC) which provides policy guidance to the study, and reviews and approves study findings.

On a general level the MTC, as the officially designated Metropolitan Planning Organization, has a federally defined role in the distribution of federal transit and highway monies. It is also involved in local expenditure of state and federal transportation funds through its relations with the California Transportation Commission. State law requires that all applications for federal and state assistance for transportation projects must be

approved by MTC. MTC annually prepares Transportation Improvement Programs that include those transportation projects it has approved. For the I-280 Transfer Concept Program there will be an opportunity to incorporate into the Transportation Improvement Programs the remaining pre-construction activities (if necessary) and the funding (design and construction/procurement) of projects advanced to implementation. Finally, in April and July of 1986 it will be possible to reflect in the Transportation Improvement Programs the results of the refined highway engineering and the transit preliminary engineering cost estimates. Thereafter, annual updates may proceed as changing circumstances warrant until all projects are completed and in operation.

The Bay Conservation and Development Commission (BCDC) was created in 1965 by the McAteer-Petris Act to protect the San Francisco Bay and marshes as natural resources, to minimize filling of the Bay and to maximize public access to the shorelines. This agency has permit approval jurisdiction over any development within the San Francisco Bay, or within 100 feet of the line of the highest tidal action in the Bay. In the I-280/Embarcadero Corridor area, jurisdiction lies within 100 feet of the water's edge. Some treatments of all Transfer Concept Program elements except Intercept Parking would be affected by this jurisdiction. The agency's permit powers govern land use, removal and replacement of fill, structural design for safety of fill, public access to the waterfront and architectural design review. BCDC would approve or reject permit applications by the sponsors after the EIR is certified and necessary City approvals are granted. BCDC's Design Review and Engineering Criteria Review Board would review and advise the Commission on preliminary and final design plans.

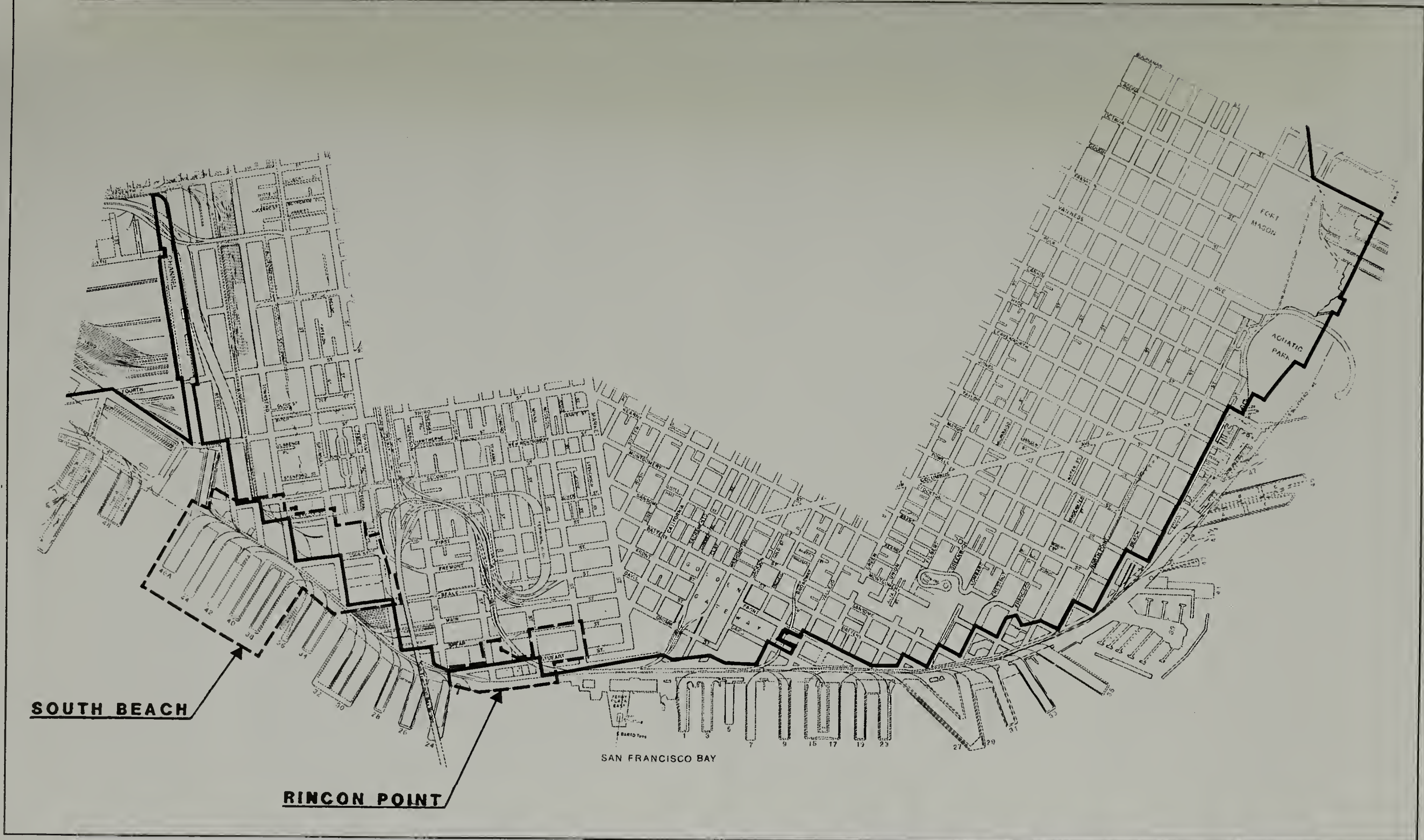
d. City Agencies

The City of San Francisco is represented on the PCC for the I-280 Transfer Concept Program study and has a direct role in the preparation and certification of the EIR. A number of City agencies will be directly and indirectly involved in the review, approval and implementation of individual elements. The San Francisco City Planning Commission and Department of City Planning would review specific elements for their consistency with the Comprehensive Plan and, if appropriate, could amend the Comprehensive Plan to be consistent with the Transfer Concept Program. The Board of Supervisors could also choose to sanction elements of the Transfer Concept Program by resolution and/or ordinance. The Department of Public Works and Muni would be implementing agencies for individual elements. Muni, which is under the jurisdiction of the San Francisco Public

Utilities Commission, would be responsible for constructing and operating the Muni Metro extension and the E-Line streetcar. The Department of Public Works would be responsible for City street modifications. Both of these agencies, as members of the Technical Advisory Committee (TAC), have been actively involved in the design and review of the Transfer Concept Program alternatives.

The San Francisco Redevelopment Agency (SFRA) and the San Francisco Port Commission are also represented on the TAC and have been actively involved in the development and technical analysis of the Transfer Concept Program alternatives. Once projects are advanced to implementation they would be directly involved with the projects located within their jurisdictions. Figure VII-1 shows the jurisdiction of these agencies. Any project located within a SFRA Project Area would be reviewed for conformance with the official Redevelopment Plan. The responsibility for implementation of roadway elements within the Redevelopment Area, such as the Embarcadero surface roadway, would be vested in the Redevelopment Agency. The Agency is authorized to buy and sell land parcels, establish conditions of use, develop public infrastructure and review and approve building and landscaping plans. If a proposed project did not conform with the Redevelopment Plan, plan amendments would be necessary. For those elements of the I-280 TCP located on Port lands, the Port would first need to make a declaration of surplus for affected lands. This situation could occur, for example, if projects advanced to implementation contain roadway improvements or street alignments that would divide parcels into sizes and shapes unusable for maritime purposes. The Port would then either enter a lease agreement or make a land exchange (via a lease) for these lands. The stipulation would be that these projects must not interfere with the Port of San Francisco's ability to manage the rest of its land for maritime purposes. Prior to any final decision, however, the Port would have to make two special findings under their Burton Act mandate: that the Port's public trust role in the management of State lands is not jeopardized by I-280 TCP project activity; and that continued viability of rail service in the waterfront area is not jeopardized by the same activity.

The San Francisco Art Commission was founded in 1932 to support and encourage community participation in performing and visual arts programs. It approves every work of art placed on City or County property and reviews the design of structures, viaducts, bridges and the like erected over or on any street or public place. The Commission's jurisdiction also encompases all Port lands (see Figure VII-1), therefore requiring their



CITY OF SAN FRANCISCO AGENCY JURISDICTIONS

– – – SAN FRANCISCO REDEVELOPMENT AGENCY PROJECTS IN I-280 CORRIDOR

——— LINE OF SAN FRANCISCO PORT COMMISSION JURISDICTION

VII-1

review of almost all the proposed elements. Concerns addressed during the Commission's review would include the quality and appropriateness of both the type of building materials used and the civic and aesthetic merits of designs. The Commission would also recommend an appropriation of up to two percent of the total project cost for adornment of public structures.

2. Relationship to Plans

The Embarcadero Corridor is an area with many planning concerns relating to land use, environmental and transportation issues. The area is near the Financial District and the San Francisco Bay; it contains major public transit facilities and auto-oriented: and is experiencing major transitions in land use patterns. As a result of this broad spectrum of issues, a number of previously prepared regional and City plans are relevant to the I-280 Transfer Concept Program. These plans and their issuing agencies are listed in Table VII-1. One of the initial aspects of the I-280 study was to review these plans, and then, drawing information from the plans and TAC and citizen input, to develop a set of proposed goals, objectives and measures (see Section II.C. of this report). Many of the I-280 study goals and objectives were drawn directly from the plans listed in Table VII-1. A complete list of goals and polices used in developing the I-280 study's goals and objectives are presented in Appendix B of the Phase I Final Report.

Specific policies intended to guide development within the area are included in several plans including: the Special Area Plan Number 1: The San Francisco Waterfront, prepared by the Bay Conservation and Development Commission; Northeastern Waterfront Plan and the Rincon Point-South Beach Redevelopment Plan, both prepared by the City and County of San Francisco; and the Golden Gate/Point Reyes General Management Plan, prepared by the National Park Service. These plans are consistent with one another. According to the Rincon Point-South Beach Redevelopment Plan, "The Plan conforms to the Master Plan of the City and County of San Francisco insofar as said Master Plan applies to the redevelopment project." The Northeastern Waterfront Plan, as an element of the San Francisco Comprehensive Plan, is consistent with other elements of the Comprehensive Plan. It is also consistent with the goals and policies of the various regional plans listed in Table VII-1.

The discussion below of the conformance of the I-280 Transfer Concept Program alternatives with City and regional policies will emphasize the Northeastern Waterfront

Table VII-1

RELEVANT REGIONAL AND LOCAL PLANS

Plan	Agency	Text Reference
An Urban Strategy for California	Office of Planning and Research, State of California	(a)
Peninsula Commute Service 5-Year Plan 1984-1989	Caltrans	(b)
Regional Transportation Plan	Metropolitan Transportation Commission	(c)
Regional Plan 1980	Association of Bay Area Governments	(d)
San Francisco Bay Plan	Bay Conservation and Development Commission (BCDC)	(e)
Special Area Plan No. 1 San Francisco Waterfront	BCDC	(f)
Total Design Plan for Pier 7 through Pier 24	City and County of San Francisco for BCDC	(g)
San Francisco Comprehensive Plan	San Francisco Department of City Planning	
Northeastern Waterfront Plan		(h)
Central Waterfront Plan		(i)
Transportation Element		(j)
Recreation and Open Space		(k)
San Francisco Urban Design Plan		(l)
San Francisco Municipal Railway 5-Year Plan 1984-1989	San Francisco Public Utility Commission	(m)
Community Development Program and Housing Assistance Plan	Mayor's Office of Housing and Community Development	(n)
Rincon Point - South Beach Redevelopment Plan	San Francisco Redevelopment Agency	(o)
Design for Development: Rincon Point - South Beach Redevelopment Project	San Francisco Redevelopment Agency and San Francisco Planning Commission	(p)
Golden Gate/Point Reyes General Management Plan	United States Department of the Interior, National Park Service	(q)

Plan because this plan is consistent with other local and regional plans and is the most comprehensive and detailed plan covering the area.

Before looking at the specific elements of each alternative, it should be noted that a primary goal of the I-280 Transfer Concept Program study is to develop alternatives consistent with regional and local policies. This consistency was sought not only with transportation policies but also with land use policies. Two of the adopted I-280 Transfer Concept Program Objectives exemplify this attempt for consistency.

- Develop a transportation system whose facilities are compatible with adjacent land uses and which are consistent with and will help support planned regional development.

- Strengthen the viability of existing uses and maintain and enhance development opportunities in conformance with adopted policies, in particular the creation of the Rincon Point-South Beach Redevelopment Project and Rincon Hill residential neighborhoods.

The I-280 Transfer Concept Program aims to create a more efficient transportation system which will increase public transit opportunities within the study area and remain consistent with major goals and policies of Bay Area regional and local plans. It is also designed to improve access to downtown San Francisco, with an emphasis on improving public transit access to the downtown. Examples of regional goals and policies that the program is consistent with are listed below. (Letters and numbers in parentheses throughout this section refer to the corresponding plan listed in Table VII-1 and the page number where the policy is listed).

- Continuing employment growth within San Francisco necessitates transport policies to shift both intercity and intracity travel from automobiles to transit (c, 23)

- Providing an adequate transportation system, including both public transit and well-maintained streets and freeways (a, 9)

- The most effective improvements in transit service over the next 20 years would be coordination and integration of existing rail and bus service (c, 23)

- Create a transportation system that is integrated with the city-centered concept of regional development (d, Goals-1)

- Intensify overall transit service in the "central area" (j, 12)

- First priority for transportation funding shall be given to serving the long-term needs of existing urban and suburban areas through maintaining and rehabilitating existing facilities, providing public transportation, reducing dependence on individual auto use, increasing the efficiency of existing facilities and completing gaps in the existing freeway system (a, 19)

- Features of land and water areas of critical regional concern for scenic resources and regional landscapes that should be protected include areas within the viewshed of the Bay (d, Rec-5).

MTC's Regional Transportation Plan and Muni's Five-Year Plan both address the I-280 Transfer Concept Program. Both these plans recognize the general elements of the I-280 Transfer Concept Program but neither establishes policies regarding the specific treatment of various elements.

Individual alternatives conform with varying degrees to MTC's regional policy to "support measures that improve or enhance alternatives to the automobile without penalizing those dependent on the auto" (c, 58). For this study, conformance with this MTC policy can be measured using the surface street performance analysis presented in Section V.C, of this EIR (see Figures V-2 through V-9). Alternative II would slightly improve street performance (i.e., duration of peak traffic and queuing) over Alternative I but would provide minimal alternatives to the automobile (adding only the E-Line bus route). Of the Embarcadero Freeway tear-down alternatives (III, IV, IVA, and VA), Alternative III would have the worst street performance, with Alternative IV having somewhat better street performance in the Ferry Building segment because a new off-ramp would be provided from the Embarcadero Freeway. Alternative V would result in less street performance improvement than Alternative II because the Embarcadero Freeway would be removed, but it would be better than Alternatives III and IV because both an on-ramp and off-ramp would be provided to the Embarcadero roadway. Alternative IVA would have very similar impacts as Alternative V. Alternative VI, which retains the Embarcadero Freeway, would have a similar surface street performance as Alternative II, and incorporates all of the proposed transit improvement. Alternative VA would also have impacts similar to Alternative V, with less queuing occuring along streets south of the Bay Bridge near the route of the Peninsula Commute Service extension. For Alternative VI, street performance would be slightly worse than under Alternative II because of some congestion caused by the at-grade rail crossings.

Another measure developed in Working Paper 2.2.2 that assesses the impacts of automobile travel for each alternative is PM Peak Period Highway Travel Times. Results

of this analysis are presented in Table E-6, Appendix E. In summary, highway travel times would be similar in Alternatives I, II and VI and would be less than for other alternatives. Alternatives III and IV, which include Embarcadero Freeway removal without both new on- and off-ramps, would have the longest highway times with travel times generally being two and eight minutes longer than in Alternatives I, II and VI. Highway travel times in Alternatives IVA, V and VA, which all include removing the Embarcadero Freeway and replacing it with new on- and off-ramps, would in general be one to three minutes less than Alternatives III and IV.

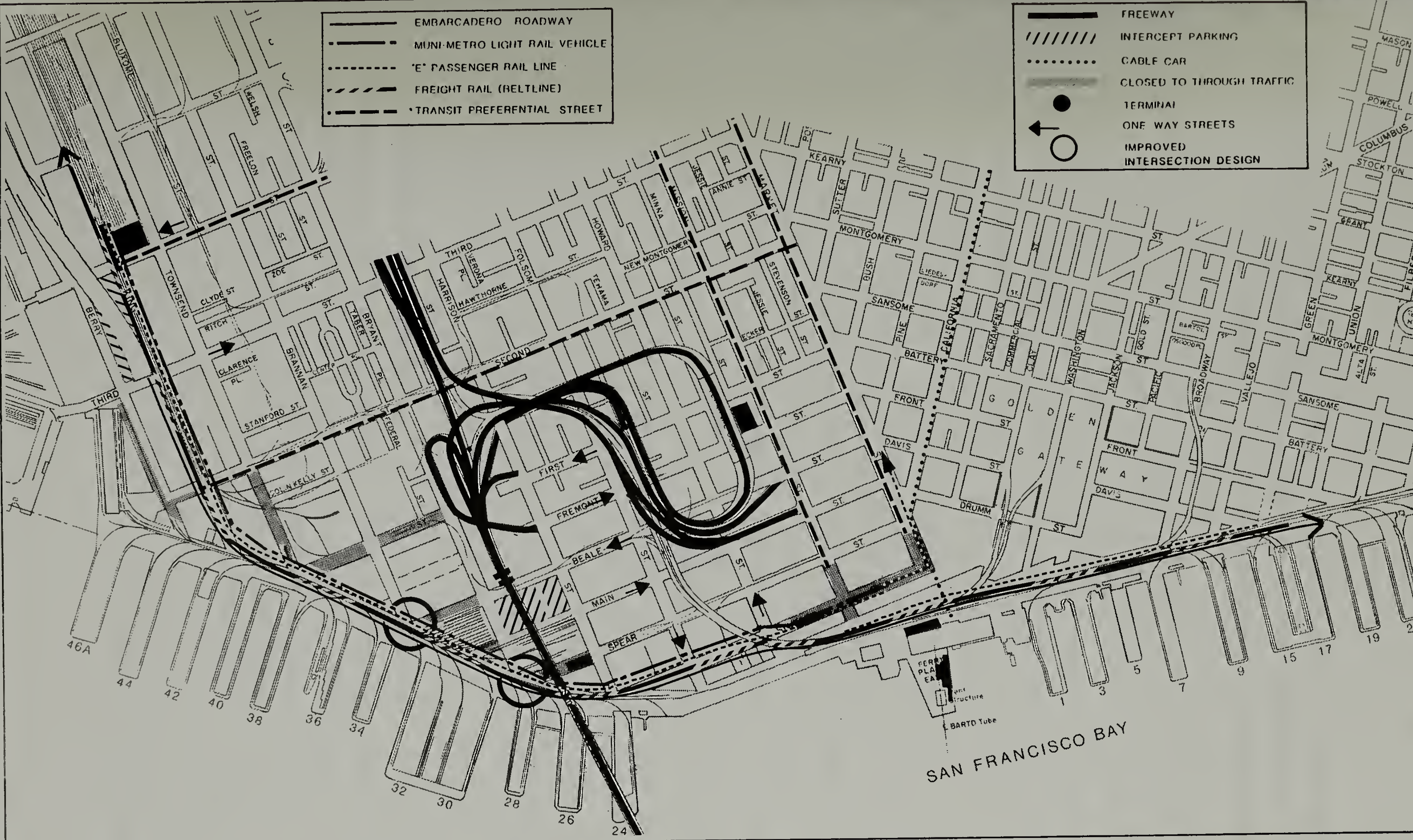
The relationship of each of the I-280 Transfer Concept Program elements with appropriate local plans is discussed below. As explained above, this portion emphasizes the conformance of each element with the Northeastern Waterfront Plan (NEWP).

a. I-280 Touch-Down

The specific treatment of the I-280 touch-down ramps is not addressed in existing plans. The Northeastern Waterfront Plan shows the existing freeway structure remaining in its present form with intercept parking located under the freeway on the block bounded by Fourth, Third, Berry and King Streets (see Figure VII-2). Use of this block for intercept parking is not precluded in Alternatives I, II and III, and is recommended in Alternatives II and III. Alternatives IV and IVA, however, include pulling back the freeway to Sixth Street, which would allow alternative uses on this parcel. Alternatives V, VA and VI add entry and exit ramps to Second Street which require most of the block bounded by Third, Second, Berry and King Streets. These ramps would not directly conflict with the Northeastern Waterfront Plan because there is no specified use for that block on the Land Use Plan map (h, 47).

b. Embarcadero Freeway

The use of the Embarcadero Freeway has been publicly debated for decades. Originally intended to connect the Bay Bridge and the Golden Gate Bridge via a route along the San Francisco Bay waterfront, the City has since adopted an official policy that the Embarcadero Freeway will not be completed, and the existing portion shall be removed (h, 17). The Northeastern Waterfront Plan calls for its removal, retaining only the bus ramps into the Transbay Terminal and the Main-Beale touch-down ramps (see Figure VII-2). Removal would prevent the Embarcadero roadway from becoming a major regional traffic corridor, free major parcels of land for more effective development, and create view



NORTHEASTERN WATERFRONT PLAN: TRANSPORTATION

SCALE 0 400 800 1600 FEET

VII-2

SOURCE: NORTHEASTERN WATERFRONT PLAN

corridors linking the City and the Bay (h, 54). If the freeway cannot be removed in the near future, the Northeastern Waterfront Plan recommends that measures be taken to improve its appearance and modify its image as a barrier to the waterfront.

The three alternatives (I, II and VI) that would maintain the Embarcadero Freeway as it is are not consistent with City policy. Alternatives III, IV, IVA, V and VA are consistent with City policy in that they call for removal of the freeway, but each alternative prescribes a different off-ramp design. The off-ramp design in Alternative III is consistent with the Northeastern Waterfront Plan. The new on- and off-ramps included in Alternatives IV, IVA, V and VA would be inconsistent with NEWP policy to not provide direct ramps from the Embarcadero roadway (h, 54). Part of the reason for this policy was to prevent the Embarcadero from becoming a major regional traffic corridor once the Embarcadero Freeway was removed. It should be noted that for any of the alternatives that include removal of the Embarcadero Freeway large traffic volumes are diverted to the Embarcadero surface roadway. Of these alternatives, Alternatives IVA, V and VA result in the best surface street performance along the Embarcadero, thus making them more consistent with City policies to increase the attractiveness of the waterfront.

c. Embarcadero Surface Road Improvements

Resurfacing and redesigning the Embarcadero roadway are the major surface road improvements incorporated into the I-280 Transfer Concept Program. Other improvements include creating high occupancy vehicle (HOV) lanes for transit, closing several streets to through traffic and providing intercept parking in the study area. These issues are discussed in detail in the Northeastern Waterfront Plan. One policy is to realign the Embarcadero roadway in front of the Ferry Building to create a major plaza, and reroute the roadway inland to Steuart Street from Howard to Harrison Streets (h, 53). Other design specifications for the Embarcadero roadway include providing two lanes in each direction with turn channelization at selected intersections, providing an exclusive right-of-way for transit and freight rail service, and creating a promenade for pedestrians, joggers and bicyclists along the water side of the roadway (h, 57). The NEWP Transportation Plan Map (Figure VII-2) shows streets proposed to be closed, intersections needing to be redesigned and sites for intercept parking.

Alternatives II through VI for the I-280 Transfer Concept Program are responsive to the policies listed above. Alternative I is not responsive to these policies because it does not

include roadway improvements. The other alternatives are equally consistent with several NEWP policies, including the same realignment of the Embarcadero roadway south of Mission Street, intercept parking, intersection redesign, and HOV lanes. Street closures and intersection redesign along the Embarcadero Corridor in Alternatives II-VI, exclusive of Alternative IVA, would not be consistent with the NEWP. These inconsistencies occur primarily within the South Beach/Rincon Hill segment and could impact plans for development on Port and Redevelopment Area lands. Only in Alternative IVA would street closures and intersection redesign be consistent with the NEWP. However, for the other alternatives, there are extensive street closures in the South Beach/Rincon Hill area that would be consistent with the NEWP's general objective of minimizing through traffic in that area to a few arterial routes.

There are several inconsistencies between the alternatives and the Northeastern Waterfront Plan. Alternative II does not include any rail improvements and therefore there would be no exclusive rail right-of-way along the Embarcadero roadway. None of the alternatives include realigning the Embarcadero roadway in front of the Ferry Building to allow for a plaza. None explicitly address the issue of providing a pedestrian/bicyclist pathway along the waterfront. However, there appears to be sufficient space between the waterfront and the Embarcadero roadway for a pathway. Alternatives IV, IVA, V and VA provide more than two lanes in each direction along portions of the Embarcadero roadway. These additional lanes would require a wider right-of-way for the roadway, especially in the Ferry Building area. The potential impact on the waterfront from the wider right-of-way would be mitigated by widening the right-of-way on the west side and not on the waterfront side of the roadway. This widening would not affect Justin Herman Plaza or other existing uses along the inland edge of the roadway.

d. Rail Transit Improvements

Proposed rail transit improvements within the study area include the Muni Metro extension, the Peninsula Commute Service extension, and the Muni E-Line streetcar. These improvements are consistent with general policies to improve public transit systems, especially those that serve downtown San Francisco. The E-Line terminus in Fort Mason was redesigned during an earlier phase of the Transfer Concept Program study to avoid conflicting with Golden Gate National Recreation Area (GGNRA) plans for development in Fort Mason. Providing E-Line rail service in Alternatives III-VI from the downtown to Fort Mason is consistent with the Golden Gate/Point Reyes General

Management Plan. This plan proposes transit service connecting parklands along the northern San Francisco waterfront using the Belt-Line railroad right-of-way. The plan further states that this service should be coordinated with City plans to operate a similar system along the northeastern waterfront (q, 71-73). The Muni Metro extension and E-Line streetcar conform with City policy to make future rail transit extensions in the City compatible with existing BART or Muni rail lines. The Peninsula Commute Service extension is not specifically mentioned in the City's Master Plan, while the Muni Metro extension and E-Line streetcar are included in NEWP policies (see Figure VII-2). However, the Peninsula Commute Service extension is consistent with the Caltrans Peninsula Train Service Five-Year Plan which calls for extension of service from Fourth and Townsend Streets to downtown San Francisco (b, 42).

Several policies in the Northeastern Waterfront Plan specifically address rail improvements in the waterfront area. These include:

- Establish a rail/bus transit line on Jefferson and Beach Streets (in the Fisherman's Wharf area), providing access to the Ferry Building and the South of Market area (h, 28)

- The E-Line vehicles should be historic in character in order to provide a special waterfront transit identity. Make the system compatible with Belt Line freight operations and Muni Metro light rail vehicles (h, 56).

The Northeastern Waterfront Plan also illustrates proposed locations for rail extensions on the Transportation Plan Map (see Figure VII-2). This map does not include the Peninsula Commute Service extension. These locations are for the most part consistent with the routes chosen for the I-280 Transfer Concept Program alternatives. The exception is Alternative III, which routes the E-Line/Muni Metro extension along Townsend Street instead of King Street between the Embarcadero roadway and the existing Peninsula Commute Service depot.

The consistency of each alternative with existing plans in terms of providing rail transit is primarily a function of the amount of rail extensions provided. Alternatives I and II provide no extensions and are therefore inconsistent with existing plans. Alternatives III, IV and IVA are consistent with local plans to provide both the E-Line and Muni Metro extension. Alternatives V and VA are inconsistent in that the E-Line would stop at the Ferry Building and would not continue on to the Peninsula Commute Service terminal. Alternative VI includes the entire E-Line route, but does not include the Muni Metro

extension. Though Alternatives V, VA and VI include only one of the two rail extensions specifically included in the City's Master Plan, the Peninsula Commute Service extension included in the alternatives would result in a second rail extension being provided in the same area. The Peninsula Commute Service extension does not preclude extension of either the Muni Metro or the E-Line through the China Basin and South Beach/Rincon Hill segments, but would minimize the need for a third transit rail facility in this area. Also, in Alternative V the new Peninsula Commute Service terminal would be within one block of the E-Line terminus, and in Alternative VI the Muni Embarcadero turnaround would allow for future extension of the Muni Metro.

The Northeastern Waterfront Plan lists about twice as many rail stops as provided for by the alternatives. However, since the Plan's adoption, Muni has established new stop standards ranging from 500 to 1,000 feet, depending upon topography. Since the Embarcadero is relatively flat, the proposed longer stop spacing would be consistent with the new Muni standards. Finally, all of the alternatives are consistent with City policies to maintain the Belt Line railroad access to the piers along the Northeastern Waterfront.

SUMMARY

The I-280 Transfer Concept Program institutional goal is to define a set of transportation projects acceptable to the City and County of San Franicsco, the Metropolitan Transportation Commission, and the California Department of Transportation, as reflected in the individual goals and objectives of these agencies. The process of selecting projects for advancement to implementation by these agencies will constitute an assessment of the eight alternatives and their attendant impacts and mitigation measures vis-a-vis the institutional goals statement. Selection of projects which are inconsistent with the goals and objectives of these agencies does not necessarily constitute a significant adverse environmental impact, for which mitigation measures are required.

VIII. EVALUATION OF ALTERNATIVES

INTRODUCTION

This chapter brings together key findings from the detailed analysis of the eight I-280 Transfer Concept Program alternatives and presents the study team's assessments of these alternatives. It is not the purpose of this chapter to recommend a preferred alternative. Rather, it is to present an objective appraisal of the environmental consequences, key issues and relative merits of the alternatives from different perspectives so that decision-makers as well as the public at large are provided with a broad and informed base on which to reach their own conclusions about the preferred course of action for the betterment of the I-280/Embarcadero Corridor.

The evaluation presented in this chapter follows the methodology adopted for this I-280 Transfer Concept Program study. It features the following evaluation framework and chapter outline as suggested by Urban Mass Transportation Administration (UMTA) guidelines:

- Effectiveness: How well do the alternatives help achieve the study's adopted goals and objectives?
- Efficiency: How cost-effective are the alternatives?
- Equity: Who are the net gainers and losers?
- Financial Aspects: Are the alternatives affordable with available resources?
- Trade-Off: What are the relative advantages and disadvantages?

Discussions in each of these areas are presented in quantifiable terms wherever possible to help insure that the assessments are as objective as possible. In some areas, however, qualitative assessments based on professional judgment are necessary to provide communication of results. Every effort has been made to keep the qualitative assessments as objective as possible by involving evaluators from a variety of backgrounds and disciplines.

In order to minimize duplication of discussion, this chapter deals with transportation, urban design and environmental aspects under Section A: Effectiveness (Goals Achievement). Data related to all the goal areas are presented in Tables VIII-1 and VIII-2 (to be found subsequently in this chapter). Cost-effectiveness is included as a separate section, Section B: Efficiency (Cost- Effectiveness). Similarly, financial feasibility and equity considerations are presented in separate sections (Section C: Equity Considerations and Section D: Financial Aspects). Material on economic and social factors, public participation and community involvement, and institutional considerations can also be found in Tables VIII-1 and VIII-2.

A. EFFECTIVENESS (GOALS ACHIEVEMENT)

The evaluation methodology adopted for this study calls for consideration of a variety of tangible and intangible factors from a number of different viewpoints. This is reflected in the goals and objectives adopted by the Study's Policy Control Committee on August 1, 1982. These goals and objectives include local, regional, and state concerns and cover the following nine subject areas:

- Transportation service
- Urban design and land use
- Environmental aspects
- Cost and cost-effectiveness
- Financial feasibility
- Equity considerations
- Economic and social factors
- Public participation and community involvement
- Institutional considerations

A total of 99 specific measures were identified for 34 objectives to help assess how well each of the alternatives does (or does not) achieve the adopted goals. These are listed in Appendix A of this EIR. Working Paper 2.2.14 of the study, entitled Achievement of Goals and Objectives, contains detailed assessments of goal achievement by objective and by measure. A composite overall assessment of the alternatives in each of the nine goal areas is presented in Table VIII-1. It is emphasized that the entries shown in the table

represent a summation of a variety of information. In most cases, the detailed measures show a variation in the relative performance of the alternatives. This required internal trade-offs to be made. Consequently, professional judgment has been applied in determining an overall composite performance evaluation. In order to maintain objectivity in assessments, the significant characteristics of the alternatives in each of the nine goal areas are presented in Table VIII-2. Those wishing to do so can examine the data presented in this table and the accompanying notes and make their individual assessment of goals achievement. The following sections provide a summary discussion of the study team's assessment of these data.

1. Transportation

Assessment of the transportation service goal involved evaluation with respect to transit service and ridership, freeway and surface street traffic, parking, pedestrian circulation and goods movement in the I-280/Embarcadero Corridor.

a. Transit Service and Ridership

With respect to transit service and ridership, Alternative I (the No Project Alternative) would be the least effective among all eight alternatives because it does not propose any major changes in the existing transit systems serving the corridor. By the year 2000 local and regional transit access to areas within the corridor would be slowed over current levels. Peak-period travel times would increase up to three minutes from the existing for selected representative trips. Bus travel would be particularly impacted in the Fisherman's Wharf area during tourist season, and in the SP Depot area. Fort Mason would continue to lack a direct transit connection to other areas in the corridor. Ridership on the 32-Embarcadero line would almost triple by the year 2000. Peak-period crowding would become more severe than existing on this and other Muni bus and cable car lines serving the corridor, resulting in deterioration in quality of service and restricting ridership growth. Muni Metro operations would be even more severely restricted than now by insufficient turnback capabilities at the Embarcadero Station. The projected year 2000 demand for Metro service would not be met. However, Muni service to the Transbay Terminal would be improved by the planned transit lane on First Street, and Golden Gate Transit's Financial District service enhanced by traffic signal coordination at three intersections along Van Ness Avenue.

Table VIII-1

GOALS ACHIEVEMENT ANALYSIS - SUMMARY

GOAL AREAS (Not in Any Order of Priority)	ALTERNATIVE I	II	III	IV	IVA	V	VA	VI
Transportation Service: Improve local and regional access through, to, and distribution within, the study area.	0	+	-	0	+	+	+	++
Urban Design and Land Use: Maintain and enhance the scenic, recreational and cultural values of the waterfront and its desirability as a place to live, work and visit.	F-1	A-5	A-3	A-2	A-1	F-2	A-4 (1)	F-3
Environmental Aspects: Preserve and enhance the environment.	0	0	+	++	++	-	-	--
Cost and Cost-Effectiveness: Develop a transportation system which is cost-effective and efficient in terms of benefits obtained for the investment required.	0	+	--	0	+	-	-	-
Financial Feasibility: Develop transportation based on a realistic estimate of resources; encourage cost-sharing by the private sector.	0	++	-	-	-	--	--	--
Equity Considerations: Provide transportation services that are designed to meet the needs of all segments of the population.	0	+	++	++	++	+	++	+
Economic and Social Factors: Provide a transportation system that stimulates social and economic revitalization of existing development in a manner consistent with other local and regional planning efforts.	0	0	+	+	+	++	++	+
Public Participation and Community Involvement: Develop transportation plans giving full consideration to the opinions of all segments of the public.	Study has a strong commitment to citizen participation. Framework has been established which will permit members of the public to express their suggestions and preferences at the public hearing on the Draft EIR Document.							
Institutional: Define a set of transportation projects acceptable to the City and County of San Francisco, the Metropolitan Transportation Commission and the California Department of Transportation as reflected in their individual goals and objectives.	**(To be assessed by each of the sponsoring agencies).**							

SYMBOLS

Performance Relative to the Status Quo (i.e. Alternative I: **the "no project" case):**

++	More Attractive
+	Somewhat More Attractive
0	About the Same
-	Somewhat Less Attractive
--	Less Attractive

URBAN DESIGN RANKING SYSTEM

Positive Impacts	A-1	BEST
	A-5	
Negative Impacts	F-1	
	F-5	WORST

(1) It should be noted that this summary rating for Alternative VA is a function of the currently studied alignment for the Peninsula Commute Service extension. This subsurface extension with a different alignment which takes advantage of joint ... depending upon its final design, could result in a much

Table VIII-2
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

CHARACTERISTIC	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCSAt-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
	(Existing)	I	II	III	IV	IVA	V	VA	VI
TRANSPORTATION SERVICE		("Do Nothing")							
A. ADDED PERSON-HOURS OF TRAVEL (Year 2000 PM Peak)									
1. Highway Users	N.A.	2,400	1,900	5,400	5,300	4,200	4,500	4,600	2,400
2. Transit Users	(Not								
Due to Street Congestion	Appli-	1,600	1,100	3,400	3,300	1,700	1,800	1,600	1,300
Due to Transit Improvements	cable)	-100	-600	-1,500	-2,100	-2,100	-2,600	-2,700	-2,300
3. Total		3,900	2,400	7,300	6,500	3,800	3,700	3,500	1,400
B. DAILY TRANSIT RIDERSHIP (Base Case) [2]									
1. E-Line Bus or Streetcar	2,600	7,400	11,400	10,300	10,700	10,900	10,000	10,000	14,700
2. MUNI Metro Extension	N.A.	N.A.	N.A.	21,700	21,700	21,700	15,500	15,500	N.A.
3. Caltrain/SP Communter Railroad	13,200	19,100	19,200	23,000	23,000	23,000	28,800	29,700	28,100
4. Total Linked Transit Trips	15,000	24,600	28,600	45,100	45,500	45,700	51,100	52,000	42,200
C. SURFACE STREET PERFORMANCE (PM Peak)									
1. Number of Congested Intersections	21	37	34	78	71	55	51	49	38
2. Block-Hours of Queueing [3]	20	55	49	139	128	75	75	68	47
D. ANNUAL VEHICLE MILES OF TRAVEL (Thousands)									
1. Reduction in Auto VMT Relative to Alternative I	N.A.	N.A.	400	14,800	14,800	14,800	22,700	25,900	11,900
E. PEDESTRIAN CONDITIONS - FERRY BUILDING									
1. Peak 15-Minute PM Pedestrian Volume	570	760	760	790	790	790	790	790	790
2. Embarcadero Roadway Vehicle Volume [4]	3,200	3,800	3,800	4,600	5,100	5,500	5,800	5,900	3,900
F. GOODS MOVEMENT [5, 6]									
1. Access to Freeways	N.A.	0	+	--	--	++	++	++	+
2. Access to Port	N.A.	0	-	-	-	0	-	-	-
3. Curbside Service	N.A.	0	-	--	--	0	--	-	--
4. Conflicts	N.A.	0	+	-	-	-	-	-	0
G. IMPACTS ON MUNI METRO SYSTEM OPERATIONS									
1. Capacity (Maximum Trains per Hour)	30	30	40	26	48	48	26	26	40
H. PARKING									
1. Number of Parking Spaces Lost	N.A.	80	1,240	1,440	1,450	1,650	1,440	1,540	1,340
2. Intercept Parking Potential (Maximum) [7]	N.A.	0	1,500	3,600	3,600	1,900	1,900	1,900	1,900

Table VIII-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

CHARACTERISTIC	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCSAt-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
	(Existing)	I	II	III	IV	IVA	V	VA	VI
URBAN DESIGN [8]		("Do Nothing")							
A. ASSESSMENT OF ELEMENTS [5]									
1. I-280	N.A.	0	0	0	++	++	-	-	-
2. Embarcadero Freeway	N.A.	0	0	+	+	++	++	++	0
3. Embarcadero Surface Road	N.A.	0	+	++	++	++	++	++	+
4. MUNI Metro Extension	N.A.	0	0	0	0	0	+	+	0
5. SP Extension *	N.A.	0	0	0	0	0	--	-	--
6. E-Line	N.A.	0	0	++	++	++	+	+	++
7. E-Line/F-Line Connections	N.A.	0	0	-	--	0	--	--	--
ENVIRONMENTAL ASPECTS									
A. USABLE LAND GAINED OR (LOST) [9]									
1. Total Developable land (Thousand sq. ft.)	N.A.	N.A.	(206)	(172)	705	448	(545)	(445)	(633)
2. Total Parkland (Thousand sq. ft.)	N.A.	N.A.	412	310	273	275	364	364	384
B. ECONOMIC IMPACTS									
1. Construction Employment (person-years)	N.A.	0	2,765	5,875	7,465	7,280	12,440	17,300	10,410
2. Operating Employment (jobs added)	N.A.	34	103	200	193	200	181	191	146
3. Business and Parking Lots Displaced	N.A.	0	9 & 2 lots	9 & 2 lots	12 & 3 lots	11 & 3 lots	22 & 3 lots	73 & 3 lots	20 & 2 lots
4. Employees Displaced	N.A.	0	29	29	19	11	59	547 - 1,670	42
C. CHANGES IN ANNUAL ENERGY CONSUMPTION									
1. Equivalent Barrels of Oil Saved (Lost) [10]	N.A.	N.A.	(980)	1,600	2,100	5,500	8,900	11,800	4,500
D. AIR QUALITY [11]									
1. No. of Sites Near or Exceeding State Standards	9	1	1	3	2	2	2	1	1
2. No. of Sites Near or Exceeding Federal Standards	6	0	0	0	0	0	0	0	0
E. NOISE [5, 12]	N.A.	0	0	+	+	+	+ and -	+	-
F. CONSTRUCTION IMPACTS [5, 13]	N.A.	0	-	-	-	-	-	-	-
G. HISTORIC, ARCHAEOLOGICAL AND PARKLAND									
1. Number of Historical Resources Demolished	N.A.	0	0	0	0	0	0	2	0
2. Number of Historical Resources with Minor Adverse Impacts	N.A.	0	0	4	4	4	7	6	7
3. Number of Historical Resources with Beneficial Impacts	N.A.	0	4	8	8	8	8	8	3
4. Archaeological Impacts	N.A.	No	No [14]	Yes [14]	Yes [14]	Yes [14]	Yes [14]	Yes [14]	Yes [14]
5. Section 4(f) Statement Required (assumes Federal funding)	N.A.	No 15	No	Yes 16, 19	Yes 16, 17, 18 19	Yes 16, 18, 19	Yes 16, 17, 19	Yes 16, 17, 19	Yes 16, 18, 19

* It should be noted that this summary rating for Alternative VA is a function of the currently studied alignment for the Pensinsula Commute Service (SP) extension. This sub-surface extension with a different alignment which takes advantage of joint development opportunities, depending upon its final design, could result in a rating of + or even ++.

Table VIII-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS [1]

CHARACTERISTIC	E-Line Metro/PCS Ext. EMB. RD. EMB. FWY. I-280 (Existing)	I ("Do Nothing")	Bus Turn-back 4 Lanes Stays On-Ramp II	Rail FM-SP to SP W. Turn 4 Lanes Remove On-Ramp III	Rail FM-SP to SP W. Loop 4-6 Lanes Remove + Off Back to 6th + On, Off IV	Rail FM-SP to SP W. Loop 4-6 Lanes Remove + On, Off Back to 6th + On, Off IVA	Rail FM-MKT. MM & PCS At-Grade 4-6 Lanes Remove + On, Off On-Off Ramp V	Rail FM-MKT. MM & PCS Subway 4-6 Lanes Remove + On, Off On-Off Ramp VA	Rail FM-SP Turnback PCSAt-Gr. 4 lanes Stays On-Off Ramp VI
H. GEOLOGY AND HYDROLOGY	(No Significant Impacts for Any of the Alternatives)								
J. ECOLOGY	(No Significant Impacts for Any of the Alternatives)								
CAPITAL AND OPERATING COSTS									
A. CAPITAL COSTS (Millions of 1983 Dollars) [20]									
1. I-280 Touchdown	N.A.	0	7.4	8.0	20.9	23.3	7.9	7.9	7.9
2. Embarcadero Freeway	N.A.	0	0	8.9	15.7	20.5	20.4	20.4	0
3. Embarcadero Surface Road	N.A.	0	31.7	25.3	36.5	38.7	24.2	24.5	29.2
4. Street and Ramp Modifications	N.A.	0	0.1	2.9	3.6	4.7	7.4	8.3	4.5
5. Intercept Parking	N.A.	0	6.7	37.0	36.0	36.0	36.0	36.0	36.0
6. TSM Improvements	N.A.	0.6	0.6	0.6	1.3	1.3	1.3	1.3	1.3
7. Subtotal: Highway Elements	N.A.	0.6	46.5	82.8	114.0	124.5	97.1	98.4	78.9
8. MUNI Metro Extension	N.A.	0	31.0	77.8	83.6	73.0	77.6	76.6	31.0
9. Caltrain/SP Extension	N.A.	0	0	0	0	0	170.7	329.2	170.7
10. E-Line	N.A.	3.6	4.1	18.3	19.9	21.3	19.4	19.9	37.3
11. Subtotal: Transit Elements	N.A.	3.6	35.1	96.1	103.5	94.3	267.8	425.7	239.0
12. Grand Total:	N.A.	4.2	81.6	179.0	217.5	218.8	364.9	524.1	317.9
B. OPERATING & MAINTENANCE COSTS (Millions) [21]									
1. I-280 Touchdown	N.A.	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
2. Embarcadero Freeway	N.A.	0.1	0.1	0	0.0	0.0	0.0	0.0	0.1
3. Embarcadero Surface Road	N.A.	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1
4. Street and Ramp Modifications	N.A.	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5. Intercept Parking	N.A.	0	0.6	1.5	1.3	1.3	1.3	1.3	1.3
6. TSM Improvements	N.A.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7. Subtotal: Highway Elements	N.A.	0.3	0.9	1.8	1.7	1.7	1.7	1.7	1.7
8. MUNI Metro Extension	N.A.	0	0.1	2.6	2.6	2.6	2.0	2.0	0.1
9. Caltrain/SP Extension	N.A.	0	0	0	0	0	0.2	0.2	0.2
10. E-Line	N.A.	1.0	3.9	4.3	4.3	4.4	3.0	3.0	4.4
11. Subtotal: Transit Elements	N.A.	1.0	4.0	6.9	6.9	7.0	5.2	5.2	4.7
12. Grand Total:	N.A.	1.3	4.9	8.8	8.7	8.7	6.9	6.9	6.4

Table VIII-2 (Continued)
SUMMARY OF SIGNIFICANT CHARACTERISTICS 1

	E-Line		Bus	Rail FM-SP	Rail FM-SP	Rail FM-SP	Rail FM-MKT.	Rail FM-MKT.	Rail FM-SP
	Metro/PCS Ext.		Turn-back	to SP W. Turn	to SP W. Loop	to SP W. Loop	MM & PCS At-Grade	MM & PCS Subway	Turnback PCS At-Gr.
	EMB. RD.		4 Lanes	4 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4-6 Lanes	4 lanes
	EMB. FWY.		Stays	Remove	Remove + Off	Remove + On, Off	Remove + On, Off	Remove + On, Off	Stays
	I-280		On-Ramp	On-Ramp	Back to 6th + On, Off	Back to 6th + On, Off	On-Off Ramp	On-Off Ramp	On-Off Ramp
CHARACTERISTIC	(Existing)	I	II	III	IV	IVA	V	VA	VI
		("Do Nothing")							
C. EQUIVALENT ANNUAL COSTS (In Millions) 22									
1. I-280 Touchdown	N.A.	0.1	0.6	0.6	1.4	1.6	0.6	0.6	0.6
2. Embarcadero Freeway	N.A.	0.1	0.1	0.6	1.1	1.4	1.4	1.4	0.1
3. Embarcadero Surface Road	N.A.	0.1	2.3	1.8	2.7	2.8	1.7	1.8	2.1
4. Street and Ramp Modifications	N.A.	---	0.1	0.2	0.3	0.3	0.6	0.7	0.4
5. Intercept Parking	N.A.	---	0.8	3.5	3.3	3.3	3.3	3.3	3.3
6. TSM Improvements	N.A.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7. Subtotal: Highway Elements	N.A.	0.3	3.9	6.8	8.9	9.6	7.8	7.9	6.6
8. MUNI Metro Extension	N.A.	---	2.1	6.7	7.1	6.3	6.2	6.1	2.1
9. Caltrain/SP Extension	N.A.	---	---	---	---	---	11.5	21.9	11.5
10. E-Line	N.A.	1.5	3.1	3.6	3.7	3.9	3.0	3.0	5.0
11. Subtotal: Transit Elements	N.A.	1.5	5.1	10.3	10.8	10.2	20.7	31.0	18.6
12. Grand Total:	N.A.	1.8	9.0	17.2	19.8	19.8	28.5	38.9	25.2
FINANCIAL ASΓ::CTS									
A. CAPITAL COSTS									
1. Transfer Concept Fund Shortfall 23	N.A.	N.A.	0.3	144.5	190.0	189.3	426.6	529.1	338.4
2. Percent of Transit Funds Required 24	N.A.	N.A.	0	8	9	9	21	33	17
3. Remaining Highway Funds Required 25	N.A.	N.A.	0	28.5	35.1	37.0	62.6	63.5	59.3
4. Local Matching Funds Required 26	N.A.	N.A.	15.7	36.5	41.4	40.6	86.2	113.2	71.1
5. Potential for Private Sector Cost Sharing	See Note 27								
B. OPERATING COSTS									
1. Percent of City's Street Maintenance Funds Required 28	N.A.	2.4	3.2	4.7	4.8	5.1	4.2	4.7	3.4
2. Percent Increase in MUNI Operating Deficit Required 29	N.A.	(0.2)	1.5	2.0	1.9	2.0	1.8	1.8	1.6
SOCIAL AND EQUITY FACTORS 30	N.A.	C	B	A	A	A	B	A	B
PUBLIC PARTICIPATION & INVOLVEMENT 31	See Note 31								
INSTITUTIONAL CONSIDERATIONS 32	See Note 32								

Notes to Accompany Table VIII-2: SUMMARY OF SIGNIFICANT CHARACTERISTICS

1. Not in any particular order of priority.

2. Year 2000 projections for baseline estimates of downtown growth.

3. The summation of the number of blocks when queuing would be present, multiplied by the number of hours duration.

4. Two-way PM peak-hour vehicle volume.

5. Symbols (Performance Relative to Alternative I, the "No Project" case.)
++ More attractive; + Somewhat more attractive; 0 about the same; - Somewhat less attractive; -- Less attractive.

6. Ratings are for goods movements along the waterfront; ratings for the Financial District could be lower in Alternatives IVA, V and VA due to congestion spill-over.

7. In multi-level parking structures at the stub end of I-280 and under the Bay Bridge approach. Because of their location, intercept parking spaces are not replacements for spaces removed from other locations.

8. Composite ratings are shown; see Working Paper 2.2.14 for a detailed treatment for each of eight urban design objectives.

9. Thousands of square feet; relative to Alternative I.

10. Relative to Alternative I. None of the Alternatives would recover the construction energy required to build them during the economic life of the project through the induced changes in annual energy consumption. Pay-back periods range from a minimum of 175 years for Alternative IVA through no pay-back ever for Alternative II.

11. Curbside carbon monoxide concentrations; state standards are 20 ppm for an 8 hour period; federal standards are 35 ppm for an 8 hour period, 9 ppm for a 1 hour period.

12. Few locations would experience a noticeable change in noise levels (3 or more decibels) with two notable exceptions: the at-grade Peninsula Commute Service extension would significantly increase noise levels in the China Basin and South Beach/Rincon Hill Areas (Alternatives V, VI); there would be a noticeable improvement of the noise environment in the area of the Ferry Building resulting from removal of the Embarcadero Freeway (Alternatives III - VA).

13. Construction activity for Alternatives II-VI would produce varying degrees of short-term inconvenience and disruption in the form of temporary restrictions of access, temporary land use changes, traffic delays, rerouting of transit service, pedestrians, detours, and impacts on nearby areas from noise and dust generation.

14. The probability and extent of archaeological impacts increases in proportion to the extent of underground construction.

15. The No Project Alternative would not involve any major government actions, even though the No Project Alternative would hinder development of the proposed Rincon Point and South Beach parks and would not accomplish the Master Plan of San Francisco or of the Golden Gate National Recreational Area.

16. The E-Line traverses Aquatic Park/Fort Mason.

17. The F-Line across Justin Herman Plaza.

18. Construction disruption to Justin Herman Plaza from the Muni Metro turnaround.

19. The proposed Rincon Point and/or South Beach parks would be smaller than proposed in the adopted redevelopment plan.

20. Includes transit vehicle costs; "base case" construction cost; 25 percent contingency factor for construction and related design costs; 15 percent engineering and administration; and 10 percent agency costs for right-of-way acquisition. Costs will vary with design options selected.

21. January, 1983 dollars; includes 25 percent contingency factor; "equiliberated" i.e. - costs reflect balancing of service provided against patronage forecast.

22. Based on: construction starting September, 1986; analysis period of 50 years after construction (i.e. through 2039); discount rate of 10 percent; useful lives of 50 years for physical facilities; 12 years for buses, 30 years for light rail vehicles and 20 years for vintage streetcars. Total for both capital, operating and maintenance costs on an annualized basis which reflects the useful economic lives of the project components.

23. In millions of dollars; capital costs inflated at 8 percent to midpoint of year of expenditure; total concept program funding constant at $104,470,000 which includes a 15 percent local match.

24. Percent of federal and state transit capital and operating funds potentially available to the region; average required over the duration of the construction period.

25. In millions of dollars; assumes 100 percent allocation to this project of certain funding sources available to the region and what is shown in the table is the amount which is still unfunded.

26. Total local funds required to match potential federal allocations for the project; inflated dollars at 8 percent. These do <u>not</u> include the unfunded remaining highway costs shown immediately above.

27. Several opportunities exist for private sector cost sharing. These include: joint development potential at the Transbay Terminal site in connection with Peninsula Commute Service extension (Alternative VA); development assessments associated with Embarcadero Freeway removal and I-280 pull-back to Sixth Street; development opportunities in the China Basin - existing SP terminal area, and construction/ operation of the intercept parking facilities. NOTE: The current analysis assumes that both the Embarcadero Freeway removal and demolition of the I-280 Freeway back to Sixth Street are eligible for transfer concept program funding. This may not be so, and indeed a repayment of federal monies may be required if the I-280 Freeway is partially demolished.

28. The City's budget for street maintenance for fiscal year ending June 30, 1983 was $5,566,213.

29. Muni's projected operating budget deficit is $104,746,000.

30. Ranked after consideration of each alternative's ability to help attain the goal of providing transportation services that are designed to meet the needs of all segments of the population, including: enhancing the mobility of the transportation disadvantaged; developing a transportation plan which does not unfairly distribute benefits or costs among various groups, consistent with other objectives sought; and minimizing the displacement of minority, low-income and other communities. It should be particularly noted that with the exception of relocation of a few houseboats in Mission Creek, none of the alternatives would displace any residential units.

    Key: "A" designates most beneficial, "B" intermediate, and "C" least beneficial.

31. The I-280 TCP has a strong commitment to citizen participation and has encouraged the public to become involved in all aspects of the project. Processes were developed for periodic feedback to help guide study staff and provide input to the decision-makers. No clear cut consensus has emerged either for or against any of the alternatives or elements. While strong advocates and opponents exist, many have expressed the need for more information as a basis for assessment. This information is now made available through the Draft EIR and associated presentations of that document. Consequently, a framework has now been established which will permit members of the public to express their reactions and preferences at the formal public hearing on the draft document. In addition, there will be other opportunities for public input at other public meetings and through the normal political process.

32. The I-280 TCP goal in the institutional area is to define a set of transportation projects acceptable to the City and County of San Francisco, the Metropolitan Transportation Commission and the Department of Transportation as reflected in the individual goals and objectives of these agencies. The selection of projects for implementation by each of these agencies will constitute a "de facto" assessment of the alternatives vis-a-vis the institutional goals statement.

Transit service and ridership would improve in Alternative II. The E-Line bus route in this alternative would provide a direct transit connection between Fort Mason and other parts of the corridor. Transit speeds would increase over Alternative I in the Fisherman's Wharf and south of Market Street areas and along the waterfront, with savings in round trip times up to five minutes. However, net increases in Muni running times are projected over the existing due to increased traffic congestion by the year 2000. The Jefferson Street transit mall option in this alternative would improve transit speeds and reduce service delays in the Fisherman's Wharf area over the existing conditions. The E-Line ridership would increase by 50 percent over Alternative I, mostly due to recreational riders attracted to vintage buses proposed for the E-Line service. Muni Metro capacity would be increased by one-third over Alternative I with the addition of a new stub turnback at the Embarcadero Station. However, the system would still be constrained in capacity to meet the projected year 2000 demand. Muni service to the Transbay Terminal and the Golden Gate Transit's Financial District service would be improved by several planned TSM improvements included in this alternative. Overall, Alternative II would be more effective than Alternative I in improving transit service and ridership potential for the corridor. However, in several aspects, its effectiveness remains somewhat restrained in response to the project year 2000 conditions in the corridor.

Transit service in the the I-280/Embarcadero Corridor would be significantly improved in Alternatives III, IV and IVA. With the Muni Metro extension to SP Depot and the E-Line rail service between Fort Mason and the SP Depot, local and regional transit access to the corridor would be enhanced with travel time savings up to 7 minutes over Alternatives I and II for many trips. The proposed transit-only lane from the Bay Bridge to the Transbay Terminal approach would expedite AC Transit bus access to the terminal and reduce the effect of the Embarcadero Freeway removal (2 to 5 minutes delay by buses during peak periods). Muni service to the Transbay Terminal and the Golden Gate Transit's Financial District service would be improved by several planned TSM improvements. However, a number of Muni bus routes serving the downtown and the south of Market Street area would experience delays up to 12 minutes over Alternatives I and II due to increased traffic congestion on surface streets. The E-Line and Muni Metro extension together would attract almost three times as many riders as the E-Line bus in Alternative II, and over four times the 32-Embarcadero line ridership in Alternative I. Peninsula Commute Service ridership would also increase by 20 percent over Alternative I due to improved transit feeder service. In Alternative III the Muni Metro stub turnback at the

Embarcadero Station would reduce the existing Metro capacity by 13 percent because the Metro line would be extended in this alternative and train movements over the extension would reduce the capacity of the stub turnback. On the other hand, the full turnaround loop proposed in Alternatives IV and IVA would increase Metro capacity by 60 percent over the existing level and would meet the projected year 2000 service demand. Overall, the rail transit improvements of these alternatives would be significantly more effective than Alternatives I and II in improving transit service and quality of service in the corridor, and in reducing the effect of the Embarcadero Freeway removal. The loop turnaround included in Alternatives IV and IVA would be particularly effective in improving Muni Metro capacity and operational efficiency. However bus transit speeds in downtown and the south of Market Street area would be slower than in Alternatives I and II because of increased street traffic congestion. Also, the effectiveness of these alternatives would be compromised somewhat because of their impact on the Belt Line railroad due to the E-Line sharing the same tracks with the Belt Line.

Transit service and ridership in the corridor would be further improved in Alternatives V and VA. Transit access from the Peninsula to downtown would be significantly improved in these alternatives with the Peninsula Commute Service extension to downtown. Travel time savings would be up to 12 minutes in comparison to Alternatives I and II, and up to 10 minutes in comparison to Alternatives III, IV and IVA. Feeder transit service needs would be significantly reduced. Surface transit delays would be reduced relative to Alternatives III, IV and IVA, although speeds would still be slower than at present. However, Muni Metro capacity in these alternatives would be significantly reduced from Alternatives IV and IVA due to the stub turnback with Metro extension. Peninsula Commute Service ridership would be more than double the current level and 25 to 29 percent above Alternatives III, IV and IVA. Total transit ridership would be 12 to 15 percent above Alternatives III, IV and IVA, and more than 86 percent over the current level. However, Muni Metro extension ridership would be reduced by 29 percent from Alternatives III, IV and IVA. Overall, Alternatives V and VA would be more effective than Alternatives III, IV and IVA in total transit service and ridership for the corridor. They are significantly more effective than Alternatives I-IVA for transit access from the Peninsula to downtown, but significantly less effective with respect to improving Muni Metro efficiency.

In Alternative VI, local and regional transit accessibility would be identical to that afforded by Alternatives V and VA except that access to the south of Market Street area

would be reduced due to loss of direct Muni Metro service to this area. Surface transit operations would be improved from those of Alternatives V and VA due to less traffic congestion on city streets. Similar to Alternative II, the stub turnback at the Embarcadero Station would increase Metro capacity and improve Metro operations over existing conditions. Total transit ridership for the corridor would be about 17 percent less than for Alternatives V and VA, and 72 percent more than the current level. Peninsula Commute Service ridership would be slightly lower than in Alternatives V and VA, while E-Line ridership would be greatest among all alternatives. Overall, Alternative VI would be comparable to Alternatives III, IV and IVA in ridership, and to Alternatives V and VA in rail transit service; but with improved surface transit service.

b. Freeway and Surface Street Traffic

With no major highway and street changes proposed under Alternative I, the I-280/ Embarcadero Corridor would be significantly more congested in the year 2000 than at present. More street intersections would operate at deficient levels of service during the PM peak period and the duration of peak traffic congestion would increase from the existing 1-2 hours to 2-3 hours. Local and regional mobility would be reduced, with an increase in highway travel time up to four minutes. Limited capacity on major highway corridors leading to the downtown would constrain the projected year 2000 highway travel demand, although there would be sufficient downtown off-ramp capacity to serve projected AM peak vehicle volumes. However, peak period travel time and delay would be reduced along the northern waterfront and its linkage with the Golden Gate Bridge due to additional intersection signalization and signal progession proposed in the this alternative.

The year 2000 traffic congestion in the corridor would be slightly reduced in Alternative II. Highway travel times would only differ by one to two minutes from Alternative I. The new I-280 on-ramp would improve access to the freeway, but would increase southbound freeway traffic, causing additional delays at the current Army Street bottleneck. Auto access to the Fisherman's Wharf area would be reduced due to the exclusive bus lane along Jefferson and Beach Streets. However, the Jefferson Street Transit Mall option of this alternative would result in less restriction for auto traffic on Beach Street and improve the quality of both bus and auto traffic in the Fisherman's Wharf area. Vehicular access to and along the waterfront would be improved with the reconstruction of the Embarcadero surface road. As in Alternative I, additional signalization and signal progression along the northern waterfront would help reduce peak period travel time and delay between the Bay Bridge and the Golden Gate Bridge.

The five alternatives which include removal of the Embarcadero Freeway (Alternatives III, IV, IVA, V and VA) would significantly impact traffic service on the Route I-80 (Bay Bridge and Bayshore Freeway) approaches to the downtown and on surface streets in the corridor and other parts of the City. Despite increased transit service in these alternatives, travel delays (in added person-hours of travel during PM peak periods) would increase over Alternatives I and II and the existing for both highway users, regional transit commuters and Muni surface transit riders. Local and regional auto access to the Chinatown, Financial District, and Fisherman's Wharf areas would be reduced. Alternative III, without replacement ramps for the removed freeway, would result in the greatest number of congested intersections of all the alternatives (more than doubling the number in Alternative I). During the evening peak hour, heavy traffic and queuing would occur on every street crossing Market Street from Fifth Street to the Embarcadero roadway, and on surface streets approaching all ramps to the Bay Bridge. During the AM peak queueing could be expected to extend for over a mile on the Bay Bridge east of the Fremont Street off-ramp. Highway travel times would be up to nine minutes longer in this alternative than in Alternative I. The impacts on I-80 traffic during the AM peak would be significantly reduced by a replacement off-ramp proposed in Alternatives IV, IVA, V and VA. This replacement off-ramp would also reduce the impacts on freeway access to activity centers such as the Port of San Francisco, Chinatown and Fisherman's Wharf. However, traffic on I-80 would still be delayed by one to two minutes compared to Alternative I, and queuing would still remain. The proposed transit-only lane from the Bay Bridge to the Transbay Terminal would help reduce delays to AC Transit bus service to San Francisco. The amount and duration of PM peak traffic queuing on surface streets would be significantly reduced by a replacement on-ramp to the remaining portions of the Embarcadero Freeway, as proposed in Alternatives IVA, V and VA. This on-ramp would further reduce the impacts on freeway access to the Port, Chinatown and Fisherman's Wharf. The PM peak surface street congestion (in block-hours of queuing) would be reduced by 40 to 50 percent in Alternatives IVA, V and VA compared to Alternatives III and IV. However, surface street performance would still be significantly worse than with Alternatives I and II which retain the Embarcadero Freeway. The new I-280 touchdown ramps in these alternatives would improve freeway access to the Embarcadero roadway and reduce queuing at the existing Sixth Street on-ramp. However, the Second and King Streets location for the ramps (as in Alternatives V and VA) would not provide as good freeway access as the Sixth Street location (as in Alternatives IV and IVA) for areas west of Second Street. It would also reduce the existing access from Third and Fourth Streets

to the Embarcadero roadway. The Muni Metro extension, E-Line and the at-grade Peninsula Commute Service extension would delay other traffic at grade crossings. However, the signal interconnection along the Embarcadero roadway and other TSM improvements in the corridor would facilitate traffic movements through the corridor and help reduce the effect of the Embarcadero Freeway removal.

Alternative VI which retains the Embarcadero Freeway, would have significantly lesser effects on surface street traffic and I-80 traffic than the five freeway removal alternatives. Surface street congestion would be reduced somewhat over Alternative II due to transit improvements. However, corridor traffic conditions would still be worse than at present. Less frequent service on Muni rail transit south of Market Street (E-Line only) would result in fewer conflicts and delays for autos compared to Alternatives III, IV and IVA. However, the at-grade Peninsula Commute Service extension would increase vehicle delays at grade crossings during peak periods.

Overall, with respect to reducing highway and traffic impacts in the I-280/Embarcadero Corridor, Alternative VI would be the most effective and Alternative III the least effective among all alternatives. Alternative II would be slightly more effective than Alternative I. Alternatives IVA, V and VA would be more effective than Alternative IV.

c. **Parking**

All eight alternatives would reduce existing parking in the corridor primarily because of the E-Line right-of-way requirements in the Fisherman's Wharf area and the reconstruction of the Embarcadero surface road. Alternative I would have the least effect on existing parking, with only 80 metered spaces removed on the Embarcadero roadway between Broadway and Bay Street. In all other alternatives, approximately 180-320 spaces would be removed from the Fisherman's Wharf area, 85 spaces from Piers 9-35, 725-995 spaces from the Ferry Building area, 5-20 spaces from the South Beach/Rincon Hill area, and 205-245 spaces from the China Basin area; a total of 1,240-1,650 spaces for the corridor. Alternative IVA would result in the most amount of existing parking removed from the Fisherman's Wharf and the Ferry Building areas. Except for Alternative I, additional intercept parking capacities would be added to the corridor in all other alternatives. The potential for intercept parking would range from 1,500 spaces for Alternative II, 3,600 spaces for Alternatives III and IV, and 1,900 spaces for Alternatives IVA, V, VA and VI. Because the potential intercept parking capacities are located in the

southern portion of the corridor, they would not replace spaces lost in the Fisherman's Wharf area and along the waterfront. However, these parking capacities could help meet portions of the additional commuter parking demand for the downtown.

d. Pedestrian Circulation

Pedestrian circulation along the corridor would generally be improved in Alternatives II-VI due to the reconstructed Embarcadero roadway. In the Ferry Building area, Alternative II would provide the best pedestrian access across the corridor due to improved crossing and signalization, narrower roadway width, lower traffic volume and absence of rail lines in the roadway median. Pedestrian access to the Ferry Building would be reduced slightly in Alternative VI due to the E-Line tracks in the median. However, for all the Embarcadero Freeway removal alternatives (Alternatives III, IV, IVA, V and VA), pedestrian access to the Ferry Building would be somewhat impeded due to longer crossing times and increased potential of conflicts with auto and rail transit traffic; particularly in Alternatives IVA, V and VA which include on-off replacement ramps. The option of a Muni trolley bus turnaround at the Ferry Building area, in Alternative IVA, would increase potential pedestrian/transit conflicts. However, the potential pedestrian/auto/transit conflicts in these alternatives could be reduced by a pedestrian grade-separation across the Embarcadero roadway.

Pedestrian circulation in the Fisherman's Wharf area would be more restricted than at present in Alternatives III, IV, V, VA and VI because of the E-Line rail operations on Jefferson and Beach Streets. The Jefferson Street Transit Mall proposed in Alternative IVA would enhance pedestrian environment and reduce potential pedestrian/auto conflicts. Alternatives V, VA and VI would result in reduced pedestrian activity near the existing SP Depot and improve pedestrian service for Peninsula Commute Service commuters because of reduced walking distance to downtown locations. Pedestrian service in this area would also be improved in Alternative IVA because the Muni Metro extension would provide convenient access for passengers transferring between the Peninsula Commute Service and Muni Metro lines, and the proposed pedestrian undercrossing across Fourth Street would eliminate pedestrian/vehicle conflicts. Pedestrian circulation would be impeded in Alternatives V and VI along the at-grade segment of the Peninsula Commute Service extension and at the Rincon Annex site. With a subway alignment for Peninsula Commute Service extension, Alternative VA would not reduce pedestrian service in the south of Market Street area, but would compound the pedestrian access and circulation difficulties at the Transbay Terminal site.

e. Goods Movement

With respect to goods movement, Alternative I would retain existing truck access along the Embarcadero Corridor except for some restriction to pier access due to planned roadway improvements between Broadway and Bay Street. Belt Line access to piers would be restricted in Alternatives III-VI due to shared tracks with the E-Line streetcar service. Labor relations and scheduling conflict issues may if unresolved, impact Belt Line operations to such an extent that maritime and commercial activities in the waterfront area become adversely affected. Operational compatibility issues were investigated during the I-280 TCP study. The design of improvements reflect the operational requirements of the Belt Line. The new I-280 touchdown ramps would improve freeway access for goods movements to the south, but the removal of the Embarcadero Freeway would reduce access to the I-80 Freeway in Alternatives III and IV. Even though Alternatives IVA, V, and VA include removal of the Embarcadero Freeway, the new on-off replacement ramps would directly connect to the Embarcadero roadway, thereby simplifying access to the waterfront compared to the existing ramps which are oriented toward the Financial District. However, in all the Embarcadero Freeway removal alternatives goods movements in the Financial District and other parts of the downtown would be impacted due to increased traffic congestion on surface streets. Alternative III would have the most severe impact on goods movement among all alternatives due to lack of replacement ramps. Alternatives II-VI all would remove truck loading zones in the Fisherman's Wharf area to accommodate the E-Line transit operations. This impact would be reduced in Alternative IVA by the proposed Jefferson Street Transit Mall which permits service access and truck loading bays on the mall. The impact could also be reduced in Alternative II with the Jefferson Street transit mall option. Existing curbside truck loading at the Hills Brothers Building would be reduced in all alternatives except Alternative I due to realignment of the Embarcadero surface road.

2. Urban Design

Details concerning the evaluation of each alternative from the urban design and land use perspective can be found in the working papers for: 2.2.5 Historic, Cultural and Recreational Resources of Alternatives; 2.2.6 Urban Design Consideration of Alternatives; 2.2.7 Visual Impact of Alternatives; and 2.2.14 Achievement of Goals and Objectives. The overall assessment by each element of the I-280 Transfer Concept Program are included in Table VIII-2 and discussed below.

With regard to the I-280 Touchdown, the proposal to remove the existing freeway structure to Sixth Street has the greatest beneficial impact to the China Basin area and is given the highest composite ranking. Other proposed actions such as a boulevard or traffic couplet connection between the on- and off-ramps and The Embarcadero or the addition of an on-ramp between Third and Fourth Streets would have a lesser positive urban design impact than the freeway removal. Only the proposal to add on- and off-ramps from the end of the freeway to Second Street represents a general worsening of overall existing conditions for the area.

The removal of the Embarcadero Freeway is viewed as an overall betterment to the environmental design qualities of the waterfront. The addition of a new on- and off-ramp to the waterfront area would have added advantages in terms of urban design because it would increase development opportunities by comparison with conditions when there are either no new ramps or only a new off-ramp.

For the Embarcadero surface road, there would not be significant differences in urban design impacts between reconstruction to four lanes throughout and reconstruction to from four-to-six lanes, as appropriate. They were given equal rating because considerable care was exercised in selecting locations where more than four lanes are called for. These sections with added capacity were selected in consultation with the urban design team members and with due consideration of site conditions and all other relevant factors. Reconstruction of the Embarcadero roadway to either a four-lane or four-to-six lane configuration represents a significant improvement over today's conditions from the urban design point of view.

From the urban design perspective, the location of the breakout for the Muni Metro extension is the element of concern. While the full extension would have an overall urban design benefit over either a turnback only or no extension because overall environmental quality of the waterfront area benefits from greater transit access, the breakout would worsen conditions for frontages on Steuart Street between Mission and Howard Streets. From the perspective of urban design a better location for the breakout would be between Howard and Folsom Streets where negative impacts can more easily be mitigated.

The proposed Peninsula Commute Service extension to the Rincon Annex in Alternatives V and VI is scored with a double minus (Table VIII-2) according to a number of the urban

design objectives, largely as a result of the at-grade portion of the tracks through China Basin and much of the South Beach/Rincon Point area. By locating the rail line underground through this area as in Alternative VA, most of the detrimental urban design impacts are adequately mitigated. However, there is still concern for the several buildings of probable historic landmark status which are directly in the path of the subway terminal adjacent to the Transbay Terminal. More open to qualification is the negative assessment (Table VIII-2) given to development impacts. A full discussion can be found in the urban design working papers, but the general points to be noted in understanding the single minus score are as follows. Impacts during construction to housing in the South Beach Redevelopment area can be detrimental if the timing of the subway project extends too far into the 1990's. Even the long-term joint development opportunities at the terminal are not considered sufficient to override this potential impact. It should also be noted that the minus score in Table VIII-2 is "soft" in the sense that it can become a plus or even a double plus if a route is selected where there are not currently planned development projects and where construction can be beneficial to development by facilitating site assembly and joint development opportunities.

The proposed E-Line service through the Fisherman's Wharf area is considered beneficial to the overall environmental quality of the waterfront. The proposal, with E-Line access to the SP Depot as compared with F-Line access only, is rated higher by a double plus score for the former proposal according to the Corridor Objective. The Jefferson Street Transit Mall concept is considered to be more beneficial in terms of its impact upon the identity and character of Fisherman's Wharf and is given a double plus score according to the Buildings and District's Objective. However, in the composite score both the Mall and the Jefferson-Beach Couplet concept are scored as being equal.

From the urban design perspective, the point to be noted with regard to the proposed E-Line/F-Line connection is that its location at The Embarcadero and Market Street intersection creates concern for pedestrian access across the Embarcadero roadway at the Ferry Building, potential Section 4(f) violations for Justin Herman Park if federal funding is provided, and possible impacts upon the existing character of the Ferry Building. The alternative location at Howard Street and The Embarcadero for the E-Line/F-Line connection creates concern for development impacts to adjacent development as a result of the "grand union" (four-way rail intersection).

In assessing the overall performance of all elements in an alternative, it was found that the overall assessment can be represented best if the alternatives were first placed into two major categories: (A) those found to have a positive effect overall from the urban design point of view and (F) those found to be negative, all urban design aspects considered. Included in the positive category were Alternatives II, III, IV, IVA and VA. Alternatives deemed to have a negative urban design rating overall are Alternatives I, V and VI. The reasoning for the overall ranking of the alternatives is as follows:

Alternative IVA is ranked higher than Alternative IV despite the fact that both alternatives are scored equally according to all eight objectives. The reason is that the former includes modifications which make slight improvements for certain districts as a result of the Transit Mall at Fisherman's Wharf, and for development as a result of better traffic circulation on local streets south of Market Street. Moreover, the fact that IVA removes the potential Section 4(f) violation for the E-Line/F-Line connection at Justin Herman Park is also a factor in ranking IVA higher than IV. With respect to Section 4(f) concerns during the construction of the Muni turnaround loop, it was concluded that the potential mitigating measure (i.e. a surface loop) would be much worse from the urban design perspective and, therefore, temporary disruptions during construction, if suitably handled, were considered a feasible and prudent alternative. The summary scores do not reflect such distinctions because in the overall sense, improvements, such as those to all parks and recreational facilities, are considered more or less equal in the two alternatives according to the individual objectives.

Alternative III is ranked as the third of the positive alternatives. The major point of separation from Alternatives IV and IVA is made on the basis of development impacts resulting from surface street congestion in the south of Market area when no new on- and off-ramps are added with removal of the Embarcadero Freeway structure. A second major development impact occurs in the China Basin area with Alternative III where the I-280 Freeway structure is removed only to the west side of Fourth street as compared to Sixth Street in the higher ranked alternatives.

Alternative VA is ranked fourth, largely because it includes proposed retention of the I-280 Freeway structure in China Basin and because, as discussed earlier, the proposed Peninsula Commute Service subway is felt to involve certain concerns to development opportunities given certain assumptions about the timing of construction and given its

current waterfront alignment. If these development concerns can be mitigated, the ranking of Alternative VA could be significantly higher as it is scored comparable to Alternative IV and IVA according to most of the other objectives. If in addition, the I-280 Freeway could be removed to Sixth Street, Alternative VA could become the highest ranked alternative.

Alternative II makes only moderate improvements according to all the urban design objectives and is ranked fifth of the positive alternatives. The negative rating for Alternative I is an indication that the do-nothing approach is considered unacceptable over the long term from an urban design point of view.

Alternatives V and VI have the lowest ranking of the so called negative alternatives largely because they contain the proposed Peninsula Commute Service extension to Rincon Annex which locates the tracks at-grade through China Basin and the South Beach/Rincon Point areas. Alternative V does propose removal of the Embarcadero Freeway structure and is comparable in that respect to Alternatives III, IV and IVA. However, the negative development impacts resulting from the Peninsula Commute Service extension cause it to be ranked below Alternative I. Alternative VI retains the Embarcadero Freeway Structure in addition to extending the Peninsula Commute Service to Rincon Annex and is the lowest ranked alternative largely as a result of the magnitude of the impacts to development and to the environmental quality of buildings and districts south of Market Street. Unlike Alternative V, these impacts are not offset by comparable large scale improvements in other areas of the waterfront.

3. Environmental Aspects

The assessment of the environmental aspects of the alternatives include evaluation with respect to physical and natural environment (land and energy conservation, air quality, noise, construction impacts, geology, hydrology and ecology); economic impacts; and historic, archaeological and parkland. The assessments with respect to economic impacts and historic, archaeological and parkland impacts are presented in Table VIII-2 by the significant characteristics of each alternative in these impact areas. The following is a summary assessment of the physical and natural environment associated with each alternative.

With respect to land conservation, Alternative I would not cause any changes in the existing uses. Alternatives II, III, V, VA and VI all would result in a reduction in total developable lands in the corridor, but an increase in total parklands. Alternatives IV and IVA would result in an increase in both total developable lands and total parklands for the corridor.

Relative to Alternative I, the No Project Alternative, Alternative II would result in increased annual energy consumption. All other alternatives would reduce annual energy consumption by 1,600 to 11,800 equivalent barrels of oil, with the largest savings occurring in Alternative VA and the smallest savings in Alternative III. However, none of these savings are sufficient to "pay back" the energy expended for construction during the 50-year assumed lifetime for fixed facilities.

With respect to air quality, no violation of federal air quality standards are predicted to occur under any alternative. A violation of the State's carbon monoxide air quality standard is predicted to occur in all alternatives, although only at very few locations (one site in Alternatives I, II, VA and VI; two sites in Alternatives IV, IVA and V; and three sites in Alternative III). The air quality in the corridor would be improved over the existing level in all alternatives. However, in all the Embarcadero Freeway removal alternatives carbon monoxide concentration would increase on surface street routes to the remaining freeway during the peak hour.

With respect to noise, few locations would experience noticeable noise level changes (a change of 3 or more decibels). There are two noticeable exceptions:

- The at-grade Peninsula Commute Service extension proposed in Alternatives V and VI would significantly increase noise levels in the China Basin and South Beach/Rincon Hill segments. Minimal impact on existing uses; significant impact on proposed office and residential uses.
- Noticeable improvement of the noise environment in the Ferry Building segment as a result of removal of the Embarcadero Freeway in Alternatives III through VA.

Except for Alternative I, all other alternatives would have a negative construction impact. Alternative II would have the least construction impacts due to the lesser amount of construction and the less disruptive nature of the construction involved. Appreciable construction impacts would occur in Alternatives III, IV and IVA due to the removal of the

Embarcadero Freeway and the construction of Muni Metro extension, E-Line rail line, and the Embarcadero surface road. Alternatives IV and IVA would have additional impacts during construction of the replacement ramps. The most extensive construction impacts would occur under Alternatives V and VA because these alternatives would also include constructing the Peninsula Commute Service extension to the downtown area. Although Alternative VI also includes the Peninsula Commute Service extension, it would have a lesser construction impact than Alternatives V and VA because the Embarcadero Freeway would not be removed in this alternative. While appreciable construction impacts are predicted for the alternatives involving the Embarcadero Freeway removal, Muni Metro extension, E-Line and the Peninsula Commute Service extension, the cumulative construction impacts of these projects on the corridor could be reduced by appropriate measures taken in the selection of construction methods, construction scheduling, and other mitigation measures during construction. The differential in the degree of cumulative construction impacts among the alternatives is not considered great enough to assign different ratings in the overall assessment.

Changes in water quality from the eight alternatives would be minimal. Any changes in sewage volume from the alternatives would be handled by the City's newly constructed sewage treatment facilities and upgraded storm sewer system. Other potential changes in water quality, from diesel buses, LRV's or landscaping, could be avoided by proper maintenance or would be minimal.

Barrier effects in the study corridor are primarily related to the width and the amount of traffic on The Embarcadero roadway. Other barrier effects to consider are the width of King Street and the barrier created by the Peninsula Commute Service extension sound walls. Alternatives II, III and VI would provide the best improvement by maintaining a four-lane roadway throughout. Of these, Alternative II would create the least barrier effect overall because King Street would remain narrow and the Embarcadero Freeway would remain and thus would not produce added traffic to the surface roadway below. Alternative III would maintain a narrow Embarcadero roadway but it is likely to be more heavily traveled, due to removal of the Embarcadero Freeway, and the increased traffic would tend to create somewhat more of a barrier effect. Alternative VI would provide the same improvements to The Embarcadero as Alternative II but this alternative would include an additional barrier to views and access by constructing a sound wall for the Peninsula Commute Service extension.

Alternatives IV, IVA, V, and VA would reconstruct The Embarcadero to six lanes in some areas and, since the Embarcadero Freeway would be removed as well, the reconstructed surface roadway would carry a greater volume of traffic. The wider, more heavily traveled surface roadways of these alternatives would pose more of a barrier effect than Alternatives II, III and VI. Alternatives IV and IVA would create an additional barrier effect in the China Basin area by widening King Street, while Alternative V would include the Peninsula Commute Service extension and sound barrier.

With respect to geology and ecology, none of the alternatives is assessed as having significant impacts on the corridor and other parts of the City.

B. EFFICIENCY (COST EFFECTIVENESS)

An important consideration in alternatives evaluation is the relationship between the effectiveness of an alternative and its cost; or how efficient are the alternatives when compared to the baseline alternative?

One common measure of transit efficiency is to relate the equivalent annual cost of transit investment to increases in annual ridership generated by such investment. The equivalent annual cost is the sum of annualized capital, operating and maintenance costs, taking into consideration the investment schedule, life cycle of capital items, and the prevailing discount rate associated with such an investment.

For the purposes of this study, the equivalent annual costs are calculated based on: construction starting September, 1986; analysis period of 50 years after construction (through year 2039); discount rate of 10 percent; useful life of 50 years for physical facilities, 12 years for buses, 30 years for light rail vehicles, and 20 years for vintage streetcars. It should be noted, however, that some physical facilities such as tunnels will likely have a greater useful life than 50 years.

Table VIII-3 presents the transit efficiency of the alternatives, relative to Alternative I, in terms of equivalent annual cost per additional rider (projected year 2000 ridership). Relative to Alternative I, Alternatives III, IV and IVA are nearly equally efficient in transit investment, and are almost 2.5 times more efficient than Alternatives II and V. Alternatives VA and VI are on the lower end of the transit efficiency scale with Alternative VA being the least efficient in transit investment. In addition to cost per

rider, Alternatives IV and IVA have added advantages over all other alternatives due to the Muni Metro subway turnaround loop which would significantly improve Muni Metro system capacity and operational efficiency.

Table VIII-3
TRANSIT EFFICIENCY (COST-EFFECTIVENESS)

- EQUIVALENT ANNUAL COST[1] OF ADDING ANNUAL TRANSIT RIDERS
  (Relative to Alternative I, in dollars per additional rider)

Alternative	Muni-Metro Extension	Peninsula Commute Service Extension	E-Line	Linked Transit[2]
I	N.A.	N.A.	N.A.	N.A.
II	N.A.	N.A.	$1.08	2.49
III	$1.07	N.A.	$1.96	$1.04
IV	$1.13	N.A.	$1.84	$1.08
IVA	$1.00	N.A.	$1.84	$1.00
V	$1.38	$4.25	$1.49	$2.34
VA	$1.37	$7.37	$1.52	$3.52
VI	N.A.	$4.58	$1.40	$3.41

[1]Transit Investment Only; total annualized capital, operating and maintenance costs.

[2]Includes Peninsula Commute Service ridership increases, but excludes duplication of transfers between transit modes.

Another measure considered in the efficiency analysis is peak period travel time through the corridor by both highway and transit users. Under this measure Alternative III would be the worst case because of Embarcadero Freeway removal without replacement ramps. Table VIII-4 shows the travel time reduction efficiency of the alternatives relative to Alternative III. In terms of equivalent annual cost per person-hour of travel time reduced, Alternatives I and II would actually show savings from Alternative III because they cost less than Alternative III. Among other alternatives, Alternative IVA would be most efficient, followed by Alternatives VI, V, IV and VA in decreasing order. It should be noted that the I-280 study scope does not include a detailed analysis of the regional impacts of each alternative outside the study corridor. Thus, from a regional perspective, certain elements of the I-280 Transfer Concept Program, such as the Peninsula Commute Service extension in Alternatives V, VA and VI, could be more cost-effective than indicated above.

Table VIII-4
TRAVEL TIME REDUCTION EFFICIENCY (COST-EFFECTIVENESS)

- EQUIVALENT ANNUAL COST[1] OF REDUCING ANNUAL PM PEAK TRAVEL HOURS IN THE EMBARCADERO CORRIDOR (Relative to Alternative III, in dollars/person-hour)

Alternative	$ Cost (Saving) Per Person-Hour of Travel Time Reduced
I	(18.0)
II	(6.7)
III	N.A.
IV	$13.0
IVA	$3.1
V	$12.6
VA	$20.6
VI	$5.5

[1] Grand Total Cost: Highway and Transit Elements; total annualized capital, operating and maintenance costs.

Overall, Alternatives V, VA and VI are assessed to be less cost-effective than Alternatives II, IV and IVA. Although as efficient as Alternatives IV and IVA in transit investment, Alternative III is assessed to be least cost-effective overall among all alternatives primarily because of its adverse impact on city streets. It is emphasized that, while an important factor, cost-effectiveness is only one of several aspects to be considered in the evaluation process. An alternative can be very cost-effective (because of lower cost) while deficient in transportation service or failing to help achieve other goals.

C. EQUITY CONSIDERATIONS

This section examines each of the major elements of the Transfer Concept Program from the point of seeing which geographic and socio-economic jurisdictions and groups are benefitted by each element and which are likely to be worse off if it were to be implemented.

1. I-280 Ramps

The pullback of I-280 Freeway to Sixth Street (Alternatives IV and IVA) would improve access to and from I-280 and the Redevelopment Agency's Yerba Buena sites. Develop-

ment in the Mission Bay area would benefit from this treatment since additional space would become available for development and access to the site improved. If the site is developed, the City would benefit by having its property tax base increased and by having increased employment opportunities. Conversely, both groups would suffer should another treatment be adopted and development of the Mission Bay site be impeded.

On the other hand, motorists traveling between the China Basin area, Central Business District (CBD), and southern portions of San Francisco, San Mateo and Santa Clara Counties would have to travel further at slower speeds and be exposed to surface street conflicts if the freeway were to be pulled back to Sixth Street. Unless the private sector is assessed for the cost of the pullback. taxpayers would incur greater costs with this treatment than with the other I-280 ramp proposals.

2. Embarcadero Freeway Removal

Local property owners and developers would gain the benefit of increased property values and development potential. Recreational users and nearby residents would benefit from increased open spaces and an enhanced environment (except during peak traffic hours when conditions would worsen due to increased traffic congestion).

Motorists from the CBD, Chinatown, the adjacent Embarcadero area traveling to/from San Mateo, Santa Clara, and southern portions of San Francisco would find their travel speeds diminished and their probability of encountering delays increased. The same is true for local auto and truck circulation and some bus transit users. Impacts can be mitigated through the addition of on/off ramps. Pedestrians in the area would continue to find exposure to accidents and encounter delays in crossing the Embarcadero roadway because of increased surface traffic.

3. Embarcadero Surface Roadway

Both through traffic and local traffic would benefit from an improved surface roadway. Access to Port of San Francisco facilities, however, would be more restricted due to the extensive length of roadway median. Local property owners would suffer loss of parking spaces and that part of their property which is acquired for roadway right-of-way. Depending upon the treatment selected, recreational users would benefit to a lesser or greater extent from land available for the proposed Rincon Point park and South Beach park.

4. **Muni-Metro Extension**

Improved operations with either a turnback or a turnaround loop would benefit Muni riders and the system operator; extension to the SP Depot would facilitate travel for users of the commuter railroad to/from the southern portion of San Francisco, San Mateo and Santa Clara Counties as well as local residents in the south of Market Street area and the Mission Bay area. Use of a portion of the Embarcadero roadway for a Muni Metro route would cause auto/transit conflicts, cause loss of parking spaces and require additional property acquisition. Recreational users of Justin Herman Plaza would be adversely impacted during construction of the underground turnaround loop; whereas the on-surface version of this loop would interfere with local auto and goods movement circulation and adversely affect the urban design aspects of the local neighborhood.

5. **Peninsula Commute Service Extension**

Primary beneficiaries would be the commuter railroad users, although travel benefits would also accrue to motorists on I-280 and 101 serving the Peninsula since auto drivers diverted to rail would reduce the pressure on highway facilities serving the same corridor. Developers in the Transbay Terminal area would have the opportunity for joint development at the new station site. Depending upon the alignment selected, historic properties and residents/developers in the South Beach/Rincon Hill area would suffer from construction disruption. Operating noise and barrier effects would only be associated with the at-grade extension option. Demolition of historic structures would be required for the current proposed alignment.

6. **E-Line**

Tourists, recreational users of the waterfront (including the Fort Mason facilities) and local travelers would benefit from improved accessibility; the system operator (Muni) and cable car users would both benefit from decreased pressure on cable car facilities. Right-of-way requirements result in loss of parking spaces and additional acquisition of private property from local neighborhoods. Belt Line rail operations would be affected because of the need to share tracks. Through and local roadway traffic would be impeded.

7. **Intercept Parking**

Intercept parking facilities would serve primarily to partially mitigate adverse conditions by enabling motorists to avoid some of the congested areas by transferring to public

transit. They would also serve some local needs and, to the extent they are located appropriately, compensate for some of the lost on-street parking spaces. They would have some adverse traffic, environmental and urban design impacts on the local neighborhoods where they are sited. The proposed intercept parking site under the Bay Bridge would either vacate Caltrans' Bridge Maintenance Facility on this site or require joint use with this facility.

8. TSM Improvements; Street and Ramp Modifications

The primary function of the TSM improvements is to facilitate a continuous traffic flow throughout the corridor, thus reducing the impact of the Embarcadero Freeway removal on regional travelers between the major freeways leading into the City. The primary benificiaries of the TSM improvements, therefore, would be through trips using the corridor, although to a lesser extent local trips would also benefit from the improvements. Under the Embarcadero Freeway removal alternatives, highway users between the Golden Gate Bridge and the Bay Bridge would experience faster travel speeds and lesser delays than they otherwise would without these TSM improvements. Commuters on the Golden Gate Transit's Financial District routes would benefit from signal improvements on Van Ness Avenue and along the northern waterfront; AC Transit commuters would benefit from improved local feeder service to the Transbay Terminal.

Regional commuters and local travelers would all benefit from the street and ramp modifications included in the alternatives. Regional commuters would be the primary beneficiaries of the transit-only lane from the Bay Bridge to the Transbay Terminal, improvements in SR-480 Main Street off-ramp, and modifications in the I-280 Fourth Street off-ramp. Local travelers would benefit from intersection improvements along the Embarcadero roadway, one-way streets, and street realignment in other parts of the corridor. Residents and workers of new developments in the China Basin area would benefit from the Fifth, Sixth and Berry Street extensions included in Alternatives V, VA and VI.

D. FINANCIAL ASPECTS

A review of funding requirements and potential funding sources was carried out as a part of the I-280 TCP study. MTC, in cooperation with the City and Caltrans, will develop a financing program for capital costs once locally preferred projects are advanced for

implementation.. Similarly, City and Caltrans will develop an operating and maintenance financing program at the same time. A description of these programs will be included as part of the subsequent environmental documentation for selected projects.

The financial analysis included appropriate contingency factors for the cost estimates and assumes an 8 percent annual inflation rate for capital costs. Base case cost estimates were used. The design refinements and options studied for various elements as a part of this study have somewhat different costs and the conclusions presented herein should be relied on only for relative comparisons. The analysis also assumes that the total transfer fund monies of $104.5 million (which includes the 15 percent local match) can be applied in any proportions to highway or transit projects. For purposes of comparison only, it is assumed that 100 percent of some highway funding sources would be allocated to I-280 Transfer Concept Program elements.

Some of the major findings of the financial analysis were presented earlier in Table VIII-2: Summary of Significant Characteristics. It was found that:

- Only Alternative II can be funded virtually in its entirety with transfer funds.
- More funds are potentially available for transit than highway elements.
- Unfunded highway needs range from $28.5 million for Alternative III to $63.5 million for Alternative VA (inflated dollars).
- Transit projects would require from 8 percent (Alternative III) of all transit capital and operating funds potentially available to the region, to 33 percent of such funds (Alternative VA).
- Local matching capital funds required range from $15.7 million (Alternative III) to $113.2 million (Alternative VA). Again, all in inflated dollars. Does not include highway shortfall.
- All alternatives contain some elements/treatments capable of being funded only with the transfer fund ($104.5 million, including local match). Various "packages" of elements/treatments, recombining portions of different alternatives, are also possible.
- Depending upon the nature of the staging program or recombination of elements /treatments, additional analytical work and impact assessment may be required should a staging program or recombination of elements/treatments be chosen as the preferred alternative.
- Operating costs for the Embarcadero roadway and other street elements would require from about 2.4 percent (Alternative I) to 5.1 percent (Alternative IVA) of the City's current street maintenance budget.

- Transit element operations and maintenance would increase Muni's operating deficit by 1.5 percent (Alternative II) to 2.0 percent (Alternative IV). The No Project alternative (Alternative I) would have a slight operating surplus.

- Analysis assumes costs of Embarcadero Freeway removal and I-280 pullback are both eligible for transfer program funding. This may not be so and I-280 pullback may even involve paying back the federal funds used in its construction.

- Several potential opportunities exist for private sector cost sharing, such as: Ferry Building and Mission Bay assessment districts; joint development at the Transbay and Peninsula Commute Service Terminals and at China Basin; and intercept parking situations.

E. TRADE-OFF ANALYSIS

It is clear from an examination of the material presented earlier that each treatment for each element of each alternative has certain individual advantages and disadvantages. The selection of components making up a locally preferred alternative will therefore depend upon how decision-makers view the relative importance of these various strong points and drawbacks. While this entire document (and particularly this chapter) discusses the various positive and negative aspects of the alternatives, elements and treatments studied, the purpose of this section of the Draft EIR is to highlight the major trade-offs which must be made; that is, the balancing of relative advantages against relative disadvantages when selecting a preferred alternative. The discussion is focused on alternatives, since these provide an overview of how individual elements interact within a total system context. This is followed by a limited discussion of the elements, since it may be decided to recombine these into a new alternative, despite the difficulties of discussing elements and treatments outside of a specific context.

1. Overview

The first major trade-off decision to be addressed by the decision-makers is that involved in choosing between the No Build Alternative I (with its low capital and operating cost) and the remaining Alternatives II through VI, with their associated changes in urban design conditions, transportation facilities, environmental conditions and other characteristics. Further, if a build alternative is chosen, a selection has to be made between the groups of alternatives which: 1) emphasize enhanced urban design opportunities through removal of the Embarcadero Freeway but with diminished transportation service characteristics (Alternatives III through VA); and, 2) with those alternatives (II and VI) which retain the freeway and provide additional transportation facilities as well, but which do not advance urban design goals to anywhere near the same extent. Within each of these two groups

there are also a number of important internal trade-offs to be made (for example, different treatments of the Embarcadero Freeway removal features in Alternatives III, IV and IVA or the bus versus rail form of E-Line improvements incorporated in Alternatives II and VI).

Other major trade-off areas include: whether or not to remove that portion of the I-280 Freeway from its existing stub end back to about Sixth Street in order to increase the land available for development; and, total amount of rail service, if any, to be provided along the Embarcadero between the CBD area and the present SP Depot (including any or all of the following: E-Line, Muni Metro extension, and/or extension of the Peninsula Commuter Service railroad into the CBD).

Information about the positive and negative impacts of each alternative was presented earlier in this document; particularly in Chapter V, Environmental Consequences. Tables VIII-1, Goals Achievement Analysis - Summary and VIII-2, Summary of Significant Characteristics seen earlier in this chapter also display much of the data needed for the trade-off analysis. These tables include information on transfer concept program fund capital cost shortfall, the potential for private sector cost-sharing and other financial and economic impact assessments which can help make the important trade-off decisions between the desire to provide improvements to the Embarcadero Freeway corridor and the competing needs elsewhere in the City and the region for the limited capital and operating funds available.

2. Alternatives

a. Alternative I

The most attractive aspects of Alternative I, the No Project alternative, are its low capital and operating cost requirements. A minimal reduction in parking spaces and relatively minor adverse environmental impacts are also in its favor. Its major disadvantage is that it does nothing to provide the necessary transportation improvements for the San Francisco Bay Area or the enhancement of the northeastern waterfront area of the City as described in Section C: PURPOSE AND NEED in Chapter II of this document and as indicated in Table VIII-2 presented earlier. It can be seen in Table VIII-2, for example, that increasing volumes and worsening travel conditions by the year 2000 will result in an additional 3,900 person-hours of travel during the PM peak period. Increases in selected point to point travel times are indicated in Tables E-1 and E-6 in the Appendix.

b. Alternative II

An important advantage of Alternative II is that it has a capital cost which can virtually be covered in its entirety using only the concept program funds. Further advantages (see Table VIII-2) are that it reduces the added PM peak person-hours of travel of the No Project Alternative I by 38 percent by improving travel conditions for both highway and transit users. Relative to Alternative I, it also: increases total daily transit ridership by over 16 percent; improves surface street performance both in terms of reducing the number of congested intersections and reducing the block-hours of queuing; increases the capacity of the Muni Metro system by 33 percent, from 30 trains per hour to 40 trains per hour; adds more than 400,000 square feet of parkland; creates 2,765 person-years of construction employment and adds over 100 jobs in operations. Other attractive features of Alternative II are that it alone of all the "build" alternatives (II through VI) does not negatively impact any historic, archaeological, or parkland resources. It has the lowest operating cost and requires the least amount of local matching funds of all the alternatives except Alternative I.

The major disadvantages of Alternative II are that it: reduces goods movement access to the port and curbside service; eliminates more than 1,200 parking spaces; fails to enhance current urban design aspects of the corridor (except for an improvement in conditions associated with the Embarcadero surface road); removes 206,000 square feet of developable land; and displaces 9 businesses and 2 parking lots with a total of 29 employees.

Relative to the other "build" alternatives (III-VA), Alternative II does not reduce the added number of person-hours of travel as well as Alternative VI (which also retains the Embarcadero but which extends the Peninsula Commute rail service to the CBD and provides E-Line rail service from Fort Mason to the SP Depot, which Alternative II does not). Alternative II has the lowest total daily transit ridership of all the build alternatives and consequently produces the lowest reduction in annual vehicle-hours of auto travel.

With respect to cost-effectiveness measures, the cost per added transit rider (expressed as the total transit annualized capital, operating and maintenance costs per annual transit passengers with duplicate transit transfers deleted) for Alternative II relative to Alternative I is $2.49. See Table VIII-3. Only two other alternatives are higher; Alternative VA with a cost of $3.52 per rider and Alternative VI with a cost of $3.41 per rider. In terms

of travel time reduction efficiency (Table VIII-4), the total annualized capital, operating and maintenance cost per person-hour of travel time reduced was computed relative to Alternative III. Alternative III was chosen as the reference (instead of the do-nothing case, Alternative I) because Alternative III has the greatest amount of added travel time of all alternatives during the year 2000 PM peak travel hours. Alternative II produces a savings of $6.7 dollars per each hour of travel time eliminated. This was surpassed only by Alternative I, whereas all other alternatives had a cost per hour of travel time reduced.

c. **Alternative III**

The first of the Embarcadero Freeway removal alternatives produces an improvement in most of the urban design aspects, with the sole negative rating being with respect to the E-Line/F-Line connections. It substantially increases daily transit ridership (Its 45,100 total linked transit trips -- that is, with duplicate transfer trips removed --would be about 83% higher than Alternative I and almost 58% higher than Alternative II). As a result, Alternative III would produce a reduction in annual vehicle-miles of travel by automobile of 14,800,000. It has the least amount of lost usable developable land of all alternatives (with the exception of Alternatives IV and IVA which feature the pullback of I-280 to Sixth Street; a treatment which could also be incorporated in Alternative III), but adds less parkland than all of the other alternatives except IV and IVA. Alternative III has the greatest potential for adding intercept parking spaces (equaled by alternative IV), a maximum of 3,600 spaces. It would also have a positive impact on noise levels in the Embarcadero Freeway area.

Among the negative attributes of Alternative III are that is would cause the greatest increase of all alternatives in added person-hours of travel during the PM peak period in the year 2000. The increase would amount to 7,300 person-hours of travel, or about 87 percent more than would occur under the do-nothing Alternative I. The difference in percentage increase in total person hours of travel (as distinguished from added person-hours of travel) is much less, however, since these added hours are estimated to represent less than 4 percent of total travel hours. The differences in highway travel times under Alternative III for individual trips varies depending upon their points of origin and destination (see Table E-6 in Appendix E). They range up to nine minutes longer for this alternative relative to Alternative I. This would be more than a 50 percent increase in travel time for auto trips between Fisherman's Wharf and the SP Depot area.

Other drawbacks associated with Alternative III are that it would result in the highest number of congested intersections and block-hours of queueing of all the alternatives studied, and it would decrease Muni Metro system capacity as a result of extending service to the SP Depot without providing a full loop turnaround. Also, this alternative could not be fully funded from transfer funds.

In terms of cost-effectiveness, Alternative III (along with Alternative IV) ranks very closely to the best performing Alternative IVA with respect to the equivalent total annual cost of obtaining additional annual transit ridership. See Table VIII-3.

It is also noteworthy that Alternative III is the only alternative to show a significant total ramp capacity deficiency (-1,660 in the year 2000 AM peak period). See Table V-10.

d. Alternative IV

This alternative would provide the positive urban design benefits described for Alternative III, except that conditions associated with the E-Line/F-Line interface would be worse, and an even more attractive rating would result from the I-280 pullback to Sixth Street. This latter action would also result in a substantial increase in total developable land (a gain of over 700,000 square feet, the most for any of the alternatives studied) but with about a 10 percent reduction in total parkland created, relative to Alternative III, and about one-third of the maximum parkland created under Alternative II (412,000 square feet). The total daily linked transit trips under Alternative IV (45,500) is about the same as the transit ridership for Alternative III (45,100). Consequently, the reduction in annual vehicle-miles of travel by automobile would be the same. There would be little difference in the parking assessment for Alternatives III and IV, since both have the most potential intercept parking spaces. An important improvement provided in Alternative IV is the Muni Metro turnaround loop. This feature would increase Muni Metro system capacity to 48 trains per hour; an increase of almost 85 percent relative to Alternative III and (along with Alternative IVA) the highest of all the alternatives studied. However, the construction of the turnaround loop would impact Justin Herman Plaza. A potential Section 4(f) violation would exist if federal funding were involved. This can only be resolved through the preparation of a Section 4(f) Statement.

Alternative IV would reduce some of the adverse aspects of Alternative III in the areas of added person-hours of travel during the PM peak period in the year 2000 and surface

street performance (number of congested intersections and block-hours of queueing). Alternative IV, however, would still rate worse than all other remaining alternatives (IVA, V, VA and VI) in these assessment areas. See Tables VIII-2, E-1 and E-6.

Alternative IV would have less desirable pedestrian flow characteristics in the vicinity of the Ferry building (primarily as a result of higher automobile volumes on the Embarcadero surface road), relative to Alternatives I, II, III and VI but better than those anticipated with Alternatives IVA, V and VA. The evaluation of Alternative IV would not be markedly different from Alternative III in such areas as: economic impacts, air quality, noise, historic, archaeological and parkland, and social and equity factors. The transfer concept program funding shortfall would be somewhat more for Alternative IV compared to Alternative III ($190 million versus $144.5 million).

Alternative IV has a relatively low equivalent cost of adding annual transit riders ($1.08 per linked transit trip, versus $1.00 for Alternative IVA which performs best with respect to this measure). On the other hand, it performs not nearly so well with regard to its efficiency in reducing added travel time. Its cost of $13.0 per person-hour of travel time reduced ranks it next to the worst-performing alternative in this comparison area (Alternative VA, with a cost of $20.6 per person-hour of I-280/Embarcadero Corridor travel time reduced).

e. Alternative IVA

This alternative would have many similar advantages and disadvantages to those described earlier for Alternative IV, with a number of notable exceptions, as described below. The added person-hours of travel during the PM peak period would be reduced considerably (to a level about that for Alternative I, the do-nothing alternative) due to provision in Alternative IVA of both an on- and off-ramp for the remaining portions of the freeway structure. Surface street performance would be considerably improved relative to Alternative III but would still be slightly worse than that of Alternative VA and well below that for Alternatives I, II and VI which retain the Embarcadero Freeway in place.

Goods movement under Alternative IVA in the Embarcadero Corridor would be the best of all the alternatives studied. Intercept parking potential would be diminished relative to Alternatives III and IV to a level somewhat above Alternative II and equal to the remaining alternatives V, VA and VI.

Alternative IVA was assessed the highest of all alternatives from an urban design perspective, with all elements rated equal to the do-nothing case or more attractive (i.e. no negative ratings). Total developable land resulting from Alternative IVA, while significantly less than that in Alternative IV (448,000 square feet versus 705,000 square feet) was still a net addition whereas all the remaining alternatives (I, II, III, V, VA and VI) result in a net loss in developable land.

Alternative IVA, while not performing as well as Alternatives I and II with respect to travel time reduction cost-effectiveness, does perform best in having the lowest equivalent annual cost of adding transit riders. See Table VIII-3.

f. Alternative V

The performance of Alternative V is comparable to that of Alternative IVA in such areas as: added person-hours of travel during the year 2000 PM peak period, surface street performance, pedestrian conditions, parking, air quality, construction impacts, historic, archaeological and parkland. The areas where it performs particularly well are in total daily transit ridership (where its 51,100 riders rank it second only to Alternative VA with its 52,000) and reduction in annual vehicle-mile of auto travel (again second only to Alternative VA), economic impacts (construction and operations employment) and changes in annual energy consumption. With respect to the latter, however, it should be noted that none of the alternatives are estimated to pay back the construction energy required during the economic life of the project.

On the other hand, Alternative V performs less well with respect to Alternative IVA in such areas as goods movement, impacts on Muni Metro system operations (where, along with III and VA it has the lowest system capacity of 26 trains per hour because of the extension to the Peninsula Commute Service without providing a full turnaround loop), and usable land gained or lost. its poor assessment with respect to urban design considerations of the at-grade Peninsula Commute Service extension should be particularly noted, along with its relatively high capital cost transfer concept fund shortfall ($426.6 million; exceeded only by the $529.1 million shortfall for Alternative VA).

g. Alternative VA

This alternative improves upon the performance of Alternative V in a number of ways, such as: somewhat less added person-hours of travel, somewhat better surface street

performance, enhanced urban design factors (the point is made in the text that with adjustment of alignment and with sensitive design treatment Alternative VA could be ranked very favorable in regard to urban design factors), changes in annual energy consumption, less usable land lost, noise, and social and equity factors. It should also be noted that Alternative VA has the largest total daily transit ridership of all alternatives and produces the greatest reduction in annual vehicle-miles of automobile travel in the Embarcadero Corridor.

Alternative VA was not deemed to perform as well as Alternative V with respect to capital costs (where it has the highest transfer concept fund shortfall: $529.1 million). In regard to economic impact, Alternative VA provides more construction and operating employment than V and has greater potential for private sector cost sharing, but on the other hand it displaces significantly more existing jobs. In assessment areas not specifically cited above (i.e. pedestrian conditions, goods movement, etc.) Alternative VA has characteristics similar to those for Alternative V. See Table VIII-2.

In regard to cost-effectiveness, Alternative VA had the highest total equivalent annual cost of $3.52 per added transit rider and had the highest cost of all alternatives in regard to equivalent annual cost of reducing PM peak period travel hours in the Embarcadero Corridor. See Tables VIII-3 and VIII-4.

h. Alternative VI

This alternative is particularly distinguished by the fact that it has the lowest of all added person-hours of travel (less than 36 percent of the person-hours that would be added under the do-nothing Alternative I). While it results in about the same number of congested intersections as Alternatives I and II, its block-hours of queuing are the least of all the alternatives.

Similarly, it has pedestrian conditions at the Ferry Building on a par with Alternatives I and II, and it achieves an intermediate level of improvement with respect to increased capacity of the Muni Metro system (an increase to 40 trains per hour from the 30 train per hour capacity of Alternative I). Its major drawbacks, however are the unsatisfactory urban design assessment given to the Peninsula Commute Service at-grade extension to the CBD and its third-highest transfer concept fund shortfall of $338.4 million. It is similar in other respects to the other alternatives discussed above, as can be seen by an examination of Table VIII-2. In terms of cost-effectiveness, it performed next to the

worst of all the alternatives studied in regard to equivalent annual cost of added transit ridership ($3.41 per added rider).

3. Elements

As has already been noted earlier in this document, the I-280 Transfer Concept Program elements were combined into alternatives ("packages") because of the impossibility of assessing them independently without some sort of explicit definition of the context in which they might function. Consequently, it is also difficult to independently discuss their relative advantages and disadvantages, although some indications of generalized performance can be inferred from the results of the alternatives evaluation. The discussion given below, therefore, should be considered as indicative only and subject to further analysis should program elements be recombined into a new grouping of elements/treatments and selected for implementation.

a. I-280 Ramps

The major trade-offs here are with respect to whether or not to pull back the structure to Sixth Street. To do so would permit development of the area now occupied by the freeway, thus enhancing development of the Mission Bay area, the City's employment opportunities and enlarging the tax base. It would also improve access to and from I-280 and the Redevelopment Agency's Yerba Buena sites. Current users of this facility would have to travel further on local streets at slower speeds. Street improvements to accommodate this further travel can be devised in a manner similar to those developed in Alternatives IV and IVA. Possible intersection capacity overloads would more likely be a function of traffic associated with the level of development in the Mission Bay area, rather than be attributable to additional loadings from current travel patterns. The cost of the demolition of the structure may not be eligible for transfer concept program funding and may, in fact, require return of federal monies spent for its original construction.

b. Embarcadero Freeway Removal

Removal of the Embarcadero Freeway would improve urban design conditions, provide development opportunities, increase local property values, enhance the environment except during peak travel periods, increase transit patronage, and increase open space. These benefits must be weighed against the cost of removal of the structure (which may

not be eligible for transfer concept funding), longer travel times for current users of this facility, increased congestion and delays for local motorists and for some transit users also, diminished accessibility for areas such as Chinatown and the Central Business District, and degraded conditions for pedestrians crossing the Embarcadero roadway.

With respect to the preferred form of treatment to be adopted should it be decided to include removal of the Embarcadero Freeway as a part of the preferred alternative, the data on Transportation Service contained in Table VIII-2 indicates the kinds of mitigation which might be expected by adding an off-ramp to the remaining freeway structure (Alternative IV versus Alternative III) and by adding both an on- and off-ramp to the remaining freeway structure (Alternative IVA versus Alternative III). It should be noted that despite the benefits achieved by the mitigation measures, all of the Embarcadero Freeway removal alternatives (III-VA) would result in additional person-hours of travel for highway users and some transit passengers due to street congestion, relative to the No Project Alternative I and the freeway-remaining alternatives II and VI. It is emphasized that these selected examples of major impacts indicated above, and those which appear subsequently below, are not intended to provide a comprehensive evaluation. The reader should carefully consider all of the material presented in this document prior to reaching a decision as to a preferred treatment.

c. Muni Metro and Peninsula Commute Service Extension

The improved operational characteristics of a full turnaround loop must be weighed against the cost of such a facility and the potential contraints posed by Section 4(f) requirements. Benefits and costs associated with a full loop turnaround need to be compared with the lesser benefits, lower costs and avoidance of any parkland impacts which characterize the limited turnback option. To give some idea of the cost and operational differences involved, the capital cost for the limited turnback facility included in Alternatives III and VI is approximately $31 million (1983 dollars). To expand this turnback to a full turnaround loop would add less than $6 million to the cost, while increasing Muni Metro system capacity from 40 to 48 trains per hour. Because of operational considerations, a full turnaround loop is particularly beneficial should this system be extended to the SP Depot (see Table E-5 in Appendix E.)

The decision as to whether or not to extend Muni Metro service to the present SP terminal will involve comparing near-term costs and patronage potential against the development

potential and service level improvements sought by the City for the South of Market, Mission Bay and Third Street Corridor areas.

The benefits of extending Peninsula Commute Service to the CBD (less travel time and reduced transfer requirements for some commuters; reduction in travel demand for Highway 101 and I-280) must be weighed against adverse local impacts in the area adjacent to such an extension and the capital cost and cost-effectiveness of the extension.

With respect to projected daily transit patronage, an examination of Table V-7 indicates ridership in the range of 15,500 to 21,700 for the Muni Metro extension, with Peninsula Commute Service extension ridership varying between 19,200 and 29,700 depending upon the alternative studied. The capital cost of the Muni Metro extension is in the neighborhood of $78-84 million (1983 dollars) while the capital costs of the Peninsula Commute Service extension is about $171 million, increasing to almost $330 million (again, in 1983 dollars) for the underground alignment currently studied in Alternative VA.

d. Embarcadero Surface Road

The nature of the design treatments proscribed for the Embarcadero surface roadway will do much to influence its functional operation and impact. For example, construction of a 4-6 lane arterial facility with a traversable median favors through movement and waterfront access, whereas a 4-lane facility with a landscaped median enhances urban design and environmental aspects (except during congested peak traffic periods) at a cost which includes diminished traffic access and circulation in the corridor. Other trade-off issues at places where right-of-way widths are limited involve the conflicting claims for Muni Metro track clearances desired by Muni, traffic lane widths, on-street parking provisions and sidewalk/promenade widths to be provided. While some of these issues can be tentatively resolved based on the study work accomplished to date, further investigations during the preliminary engineering and final design phases will also be required.

e. Muni E-Line

Travel improvements enjoyed by tourists, recreational users of the waterfront (including the Fort Mason facilities) and local travelers, along with benefits to the system operator and cable car users resulting from decreased demand for cable car service, has to be weighed against: loss of parking space; additional acquisition of private property from local neighborhoods for right-of-way; impacts on the Belt Line rail operations because of

the need to share tracks; and impediments to roadway traffic; and the potential constraints posed by an E-line through Aquatic Park because of Section 4(f) requirements. The appeal of historical streetcars to tourists and recreational users needs to be judged against the cost differential vis-a-vis an E-Line vintage bus service.

The projected total daily year 2000 transit patronage for the E-Line bus (Alternative II) shown in Table V-7 is 11,400, while patronage on the E-Line streetcar line in Alternative VI is 14,700; an increase of about 29 percent. The corresponding capital costs for the E-Line shown in Table VIII-2 are $4.1 million (1983 dollars) for Alternative II and $37.3 million for Alternative VI (a nine-fold increase). Operating costs (again expressed in 1983 dollars) for the E-Line under Alternative II are $3.9 million and for Alternative VI they are $4.0 million. Again, the reader is cautioned that although the figures shown in this paragraph have been presented as illustrative impacts because they are believed to be of particular interest to decision-makers, numerous other factors (such as environmental and urban design aspects to cite but two examples) must also be considered in deciding upon a particular treatment for an element.

f. Intercept Parking

The functional benefits of these facilities as mitigation measures (and not as replacement facilities for lost spaces) need to be considered with respect to their costs. Financial aspects are another important consideration since the possibility exists that either some portion or perhaps all of the capital and/or operating costs of intercept parking facilities can be provided by the private sector.

g. TSM Improvements; Street and Ramp Modifications

Transportation System Management (TSM) measures are, by definition, improvements to traffic and traffic operations which can be implemented at relatively low cost. Consequently, they are normally part of the ongoing activities of the City's Department of Public Works and their implementation is generally limited only by the staff and budget available. It is expected some form of TSM measures will be implemented, regardless of how I-280 Transfer Concept Program projects are eventually defined. The number, locations and exact nature of the TSM measures to be implemented, however, will vary depending upon the characteristics of projects selected for implementation. In particular, the adopted Embarcadero surface road treatment chosen and the street and ramp modifications selected for implementation will need to be considered jointly with the TSM measures during the design and implementation phases of the I-280 TCP elements.

4. Closure

It is anticipated that selection of projects for implementation will involve making a series of choices. Clearly, the first question to be resolved is whether or not to do anything at all. The material presented in Chapter II, Section C: Purpose And Need and elsewhere in this document reporting on the assessment of Alternative I provides the basis for such a decision (coupled, of course, with testimony provided through the public hearing process).

If it is decided not to select the No Project alternative, a logical next step would be to examine Alternative II, since it can be virtually fully funded through the I-280 Transfer Concept Program, and assess whether it sufficiently serves the identified needs or whether additional improvements are required. Note that "Alternative II" (or any of the alternatives for that matter) need not be exactly as currently defined, but could involve design options and "mix and match" treatments of elements. However, additional analytical work and impact assessment may be required depending upon the options or combinations selected.

The making of this decision as well as subsequent ones will be directly dependent on the value judgments of the decision-makers. The various alternatives provide greater or lesser improvements in cost-effectiveness, environmental impacts, urban design improvements, additional transit industry, and so on. In practice, of course, most decision-makers -- like most people -- will be concerned about all of these factors, and will seek to reach the best compromise possible.

IX. COMMUNITY INVOLVEMENT/CITIZEN PARTICIPATION

A. PRINCIPLES AND CONCEPTS

The I-280 TCP Study has a strong commitment to citizen participation and has encouraged the public to become involved in all aspects of the project. This emphasis is responsive to the requirements of the California Environmental Quality Act (CEQA) as well as to the extensive interest in the area. The public involvement program was multi-faceted and wide reaching, including newsletters, surveys and questionnaires, workshops, interviews with key leaders, meetings with community groups, and encouragement of media coverage. Processes were developed for periodic feedback to the decision makers so that they could have the benefit of citizen suggestions as they determined the actions to be taken. This discussion in this chapter covers the community involvement/citizen participation process through the public hearing on the Draft EIR. There will be additional opportunities for citizens to provide input into the selection of projects for implementation, and later on, the approval of specific elements, but such efforts are not discussed herein.

B. OUTREACH TO THE PUBLIC

A first step for the study team was to develop a central mailing list of nearly 1900 names for use throughout the project to ensure that diverse Bay Area groups and individuals - many of whom are affected by decisions about the Embarcadero travel corridor - were identified and contacted throughout the entire EIR process. The list included neighborhood activists, business groups, labor leaders, professional societies, civic leaders and organizations, public agencies, elected and appointed political officials, media representatives and hundreds of individuals who expressed interest in the study. Everyone on the list received the Study Newsletter; from the list, names were also selected for special activities such as interviews, workshop participation and selected surveys, and contact was maintained throughout the duration of the study.

C. KEY INTERVIEWS

One technique for soliciting citizen input was a series of interviews conducted with key Bay Area leaders from mid-June through the end of August 1982. Approximately 125

individuals were selected as a representative pool from which to draw approximately 50 people to be interviewed in depth about the project. The interviews were not intended to be a statistically significant sample, but rather a display of the attitudes and preferences of the people selected to participate. A detailed questionnaire and background information on the proposed scope of the study were sent to the entire pool. Special efforts were made to assure geographic diversity of respondees.

Highlights of the interview responses show:

- A strong preference (60%) for public transit as the primary transportation mode in the I-280 corridor
- More than half (60%) of the respondents would like to see the Embarcadero Freeway demolished between Beale and Broadway
- Of the people who expressed an opinion about extending Muni Metro, 75% wanted it extended to the SP Depot
- An extension of PCS trains to downtown was favored by slightly more than one-third (35%) of respondents
- Over 90% of respondents would like the Embarcadero surface road reconstructed into a boulevard - optimally no more than four lanes in width
- A Muni E-Line trolley along the Embarcadero was favored by 80% of the respondents; only 20% expressed a preference for a bus line
- There was strong support (85%) for an intensive public involvement program, with only four people expressing cynicism about the value of citizen participation

In addition, those interviewed substantially endorsed the Project's identified goals and objectives, although a few suggested minor changes in wording or sequence.

The recommendations which resulted from the key interviews were shared with the study's Technical Advisory Committee and produced changes in format and content of techncial papers and in recommendations made to the Policy Control Committee.

D. PUBLIC SCOPING PROCESS

"Scoping" is the process by which the issues to be addressed, the alternatives to be examined and the methodology to be used in the preparation of an EIR are determined.

The scoping process for the I-280 Transfer Concept Program began with a public meeting held on June 1, 1982 in the State Building in San Francisco. Notice of the meeting, including general background information on the I-280 study, was sent to more than 500 individuals and organizations and an announcement of the meeting appeared in the Federal Register. A background paper was prepared for all attendees and maps and other graphics were displayed in the meeting room. The study team made brief presentations explaining the proposed project and then opened the meeting for comments from the more than 80 people in attendance.

Public comments covered a wide variety of issues and viewpoints. Many participants wished to remove the Embarcadero Freeway; others expressed concern about the impact of such an action on traffic throughout the Embarcadero Corridor.

The public scoping meeting was the first activity in an overall program to involve citizens in the I-280 Transfer Concept Program. It began the process through which the overall scope of the I-280 EIR was defined.

E. FOCUSED GROUP WORKSHOPS

Another method for bringing citizens into project activities was the focused group workshop. A number of small discussion groups (20-30 people) were held during the study. The last workshop, to be held immediately prior to the formal public hearing on the Draft EIR, will be aimed at attracting a larger audience. It will seek to better inform the general public about the project in the expectation that this will encourage more informed comments at the public hearing itself.

During the initial phase of the study three workshops targeted two specific areas of concern. The first workshop, held on July 27, 1982 in San Francisco, reviewed the proposed goals and objectives for the overall study and made recommendations for expansion and revision of the draft report prepared by the study team. Their input was considered by the Technical Advisory Committee; changes were made in the original draft report before adoption by the Policy Control Committee at its August 11 meeting.

The second set of workshops - one held in Oakland on August 17, 1982 and the other in San Francisco on August 18, 1982 - grappled with identifying alternatives to be studied in depth during an earlier phase of the project. Participants critiqued six alternatives

presented by the study team and identified additional options that might be considered for subsequent study.

A number of workshops were also held during the second phase of the study. These were targeted at the key staff members and management of the study's sponsoring agencies. Featured were in-depth presentations and discussions of the Working Papers on the Achievement of Goals and Objectives and the Cost-Effectiveness and Trade-Off Analysis.

F. OTHER PUBLIC PRESENTATIONS

Individual presentations and discussion meetings were held with over 20 groups, such as: SPUR (San Francisco Planning and Urban Research); San Francisco Chamber of Commerce; Fisherman's Wharf Merchant's Association; Citizen's Committee for the Removal of the Embarcadero Freeway; San Francisco Tomorrow; Minority Citizens Advisory Committee to MTC; the Peninsula Committee Action Group; San Francisco Heritage; the Embarcadero YMCA; and others. A specially prepared coordinated slide show-tape recorded presentation developed as a part of this study was featured at a number of these meetings.

In addition, all of the meetings of the Study's Policy Control Committee were open to the public and citizens were invited to make comments or ask questions at each session.

G. NEWSLETTERS

Another useful tool for providing information to the public about the study were the four Project Newsletters issued during the course of the study. About 4,000 copies of each were distributed. In addition to disseminating general information about the project to the public, the newsletter was designed to encourage input from the public through special surveys and letters to the editor. The newsletter was an important means for two-way communication between the study team and the public. One of the newsletters was a "popularized" version of the study's final report on the first phase of the EIR process.

H. MEDIA INVOLVEMENT

Selected representatives of the electronic media and the press were kept informed of all project activities; briefings for the press were held during the study as specific milestones were reached.

I. PUBLIC HEARING

A further opportunity for citizen involvement will be the public hearing on the contents of the Draft EIR. Members of the interested public are encouraged to review and comment on the contents of the Draft EIR in order to provide the decision-makers with citizen reaction to the selected alternatives and their impacts. Comments received at the hearing will become a permanent part of the study's records and may directly influence the selection of projects for implementation of the I-280 Transfer Concept Program.

X. DISTRIBUTION LIST

FEDERAL AGENCIES

Urban Mass Transportation
Administration, Region 9
211 Main Street, Room 1160
San Francisco, CA 94105

Division Director
Federal Highway Administration
P.O. Box 1915
Sacramento, CA 95809

District Engineer
U.S. Corps of Engineers
211 Main Street
San Francisco, CA 94105

Director, Region 9
Environmental Protection Agency
215 Fremont Street
San Francisco, CA 94105

District Chief, Water Resource
Division
U.S. Geological Survey
855 Oak Grove Avenue
Menlo Park, CA 94025

Jack Davis, Gen. Supt.
GGNRA - Natl. Park Service
Fort Mason, Bldg. 301
San Francisco, CA 94123

Shirwin Smith, Liaison to
GGNRA Advisory Committee
Fort Mason, Bldg. 201
San Francisco, CA 94123

STATE AGENCIES

State Office of Intergovernmental
Management
State Clearinghouse
1400 10th Street
Sacramento, CA 95814

Don Rake
Air Resources Board
General Projects Section
P.O. Box 2815
Sacramento, CA 95814

Executive Office
Air Resources Board
1102 Q Street
Sacramento, CA 95814

Executive Director
Public Utilities Commission
350 McAllister Street
San Francisco, CA 94102

Coordinator, Scenic Highway Program
Div. of Local Assistance
California Highway Commission
1120 N Street
Sacramento, CA 95814

Regional Office
California Coastal Commission
631 Howard Street
San Francisco, CA 94105

Director
Dept. of Parks & Recreation
Office of Historic Preservation
1416 - 9th Street
Sacramento, CA 95814

Director
Regional Water Quality Control Board
1111 Jackson Street
Oakland, CA 94607

San Francisco Bay Conservation and
Development Commission
20 Van Ness Avenue
San Francisco, CA 94102

Michael Evanhoe, Exec. Director
California Transportation Comm.
1120 N Street
Sacramento, CA 95814

REGIONAL AGENCIES

Association of Bay
Area Governments
P.O. Box 2050
Oakland, CA 94604

REGIONAL AGENCIES (cont.)

Irwin Mussen
BAAQMD
939 Ellis Street
San Francisco, CA 94109

Bay Area Rapid Transit District
800 Madison Street
Oakland, CA 94607

California Archaeological
Site Survey Regional Office
N.W. Info Center
Dept. of Anthropology
Sonoma State University
Rohnert Park, CA 94928

Golden Gate Bridge Highway & Transportation District
P.O. Box 9000, Presidio Station
San Francisco, CA 94129

Alameda-Contra Costa Transit Dist.
508 - 16th Street
Oakland, CA 94612

Metropolitan Transportation Commission
101 - 8th Street
Oakland, CA 94607

San Mateo County Transit District
400 South El Camino
San Mateo, CA 94402

CITY AND COUNTY OF SAN FRANCISCO

Robert Levy, Superintendent
Bureau of Bldg. Inspection
450 McAllister Street
San Francisco, CA 94102

SF Committee for Utility Liaison on Construction & Other Projects
c/o GES Utility Liaison
City Hall, Room 363
San Francisco, CA 94102

Roger Boas
Chief Administrative Officer
289 City Hall
San Francisco, CA 94102

Eugene L. Gartland, Executive Director
Randall S. Rossi
Port of San Francisco
Ferry Building, Room 200
San Francisco, CA 94111

San Francisco Redevelopment Agency
939 Ellis Street
San Francisco, CA 94109

Paula Jesson
Deputy Director
City Attorney's Office
Room 206, City Hall
San Francisco, CA 94102

Jonathan Malone, Secretary
Landmarks Preservation Advisory Board
450 McAllister Street
San Francisco, CA 94102

Bill Witte, Director
Mayor's Economic Development Council
100 Larkin Street
San Francisco, CA 94102

Tom Jordan, Dir. Bureau Services
Public Utilities Commission
949 Presidio Avenue, Room 150
San Francisco, CA 94115

Barbara Moy, Assistant Director, PUC
Bureau of Energy Conservation
949 Presidio Avenue, Room 111
San Francisco, CA 94115

Deborah Lerner
Recreation & Park Department
McLaren Lodge, Golden Gate Park
Fell & Stanyan Streets
San Francisco, CA 94117

San Francisco Bureau of Engineering
Streets and Highways
45 Hyde Street, Room 212
San Francisco, CA 94102

CITY AND COUNTY (cont.)

City Planning Commission
450 McAllister
San Francisco, CA 94102

Lee Woods, Secretary
Toby Rosenblatt, President
Susan Bierman
Jerome Klein
Yoshio Nakashima
C. Mackey Salazar

Edward Phipps
SF Fire Dept., Div. of Planning
& Research
260 Golden Gate Avenue
San Francisco, CA 94102

Harold Gassenheimer, General Manager
SF Municipal Railway
949 Presidio Avenue
San Francisco, CA 94115

Wallace Wortman, Dir. of Property
SF Real Estate Department
450 McAllister, Room 600
San Francisco, CA 94102

George Nakagaki, Manager
Water Department, Distribution Div.
425 Mason Street
San Francisco, CA 94102

Claire Isaacs, Dir.
S.F. Arts Commission
401 Van Ness Avenue
San Francisco, CA 94102

OTHER LOCAL AGENCIES

Clerk of the Board
Alameda County Board of
Supervisors
1221 Oak Street
Oakland, CA 94612

Clerk of the Board
Contra Costa County Board
of Supervisors
651 Pine Street
Martinez, CA 94553

Clerk of the Board
Marin County Board of
Supervisors
Civic Center
San Rafael, CA 94901

Clerk of the Board
San Mateo County Board
of Supervisors
401 Marshall Street
Redwood City, CA 94063

Clerk of the Board
Santa Clara County Board
of Supervisors
70 West Hedding
San Jose, CA 95110

DECISION MAKERS

Mayor Dianne Feinstein
City & County of San Francisco
#200 City Hall
San Francisco, CA 94102

Board of Supervisors
Harry G. Britt
Richard Hongisto
Willie B. Kennedy
Quentin L. Kopp
Bill Maher
John L. Molinari
Wendy Nelder, President
Louise H. Renne
Carol Ruth Silver
Nancy G. Walker
Doris M. Ward
Room 235, City Hall
San Francisco, CA 94102

DECISION MAKERS (cont.)

Hon. Barbara Boxer
901 Irwin Street
San Rafael, CA 94901

Hon. Sala Burton
450 Golden Gate Avenue
San Francisco, CA 94102

Hon. Ronald V. Dellums
201 13th Street, Room 105
Oakland, CA 94617

Hon. Don Edwards
1625 The Alameda
San Jose, CA 95126

Hon. Tom Lantos
520 S. El Camino Real
San Mateo, CA 94402

Hon. George Miller
367 Civic Drive
Pleasant Hill, CA 94523

Hon. Norman Mineta
1245 S. Winchester Blvd.
San Jose, CA 95128

Hon. Fortney (Pete) Stark
22300 Foothill Blvd.
Hayward, CA 94541

Hon. Ed Zschau
505 W. Olive, Suite 125
Sunnyvale, CA 94086

Hon. Alfred E. Alquist
100 Paseo de San Antonio
San Jose, CA 95113

Hon. Dan Boatwright
1035 Detroit Avenue
Concord, CA 94518

Hon. John F. Foran
15 Southgate Avenue
Daly City, CA 94015

Hon. Johan Klehs
2450 Washington Avenue
San Leandro, CA 94577

Hon. Ernest Konnyu
7337 Bollinger Road
Cupertino, CA 95014

Hon. Bill Lockyer
22300 Foothill Blvd.
Hayward, CA 94511

Hon. Milton Marks
350 McAllister Street
San Francisco, CA 94102

Hon. Alister McAlister
554 Valley Way
Milpitas, CA 95035

Hon. Dan McCorquodale
100 Paseo de San Antonio
San Jose, CA 95113

Hon. Robert W. Naylor
666 Elm Street
San Carlos, CA 94070

Hon. Louis J. Papan
345-E Serramonte Plaza
Daly City, CA 94015

Hon. Nicholas C. Petris
1111 Jackson Street
Oakland, CA 94607

Hon. Byron Sher
785-C Castro Street
Mt. View, CA 94041

Hon. John Vasconcellos
100 Paseo de San Antonio
San Jose, CA 95113

MEDIA

Thomas Fleming
The Sun Reporter
1366 Turk Street
San Francisco, CA 94115

Rob Waters
Tenderloin Times
146 Leavenworth Street
San Francisco, CA 94102

Patrick Anderson, Managing Editor
Betty Gong Young, General Manager
Asian Week
811 Sacramento Street
San Francisco, CA 94108

Editor
El Bohemio News
3133 - 22nd Street
San Francisco, CA 94110

Howard Imazeki, Editor
Hokubei Mainichi
1746 Post Street
San Francisco, CA 94115

Jong Choi
Korea Times
274 Shotwell
San Francisco, CA 94110

Jim Doughfit
Robert Maynard, Editor/Publisher
The Tribune
409 - 13th Street
Oakland, CA 94612

Harry De Morro
San Francisco Business Journal
745 Stevenson
San Francisco, CA 94103

City Editor
San Jose Mercury
Fox Plaza, Suite 318
1390 Market Street
San Francisco, CA 94102

Muhammad Al-Kareen, Editor
New Bay View
6220 Third Street
San Francisco, CA 94124

Ed Diokno, Comm. Editor
Philippine News
148 Spruce Avenue
So. San Francisco, CA 94080

Alan Kay
San Francisco Bay Guardian
2700 - 19th Street
San Francisco, CA 94110

Allen Temko
Carl Nolte
San Francisco Chronicle
901 Mission Street
San Francisco, CA 94103

Sidney Kossen
Margo Patterson Doss
Don Lattin
San Francisco Examiner
110 - 5th Street
San Francisco, CA 94103

Jim Kelley
Dan Borsuk
San Francisco Progress
851 Howard Street
San Francisco, CA 94103

Belva Davis
Urban Affairs Specialist
KRON-TV Channel 4
1001 Van Ness Avenue
San Francisco, CA 94109

MEDIA (cont.)

Frank Philpot, News Director
Juana Samayoa, Public Affairs
KBHK-TV Channel 44
420 Taylor Street
San Francisco, CA 94102

Jesus Javier, News Manager
Bill Nieves, Public Affairs
KDTV-TV Channel 14
2200 Palou Avenue
San Francisco, CA 94124

Joe Barnes
Rose Guilbault
KGO-TV Channel 7
277 Golden Gate Avenue
San Francisco, CA 94102

Bill Applegate
Len Schlosser
Art Kern
KPIX-TV Channel 5
855 Battery Street
San Francisco, CA 94111

Roxanne Russell
KQED-TV Channel 9
500 - 8th Street
San Francisco, CA 94103

KTSF-TV Channel 26
185 Berry Street
San Francisco, CA 94107

Fred Zehnder
Ian Zellick
KTVU-TV CHannel 2
2 Jack London Square
Oakland, CA 94607

KCBS Radio
1 Embarcadero Center
San Francisco, CA 94111

Jack Swanson
KGO Radio
900 Front Street
San Francisco, CA 94111

LIBRARIES

Faith Van Liere
Documents Library
City Library - Civic Center
San Francisco, CA 94102

Lin Max
Cogswell College Library
600 Stockton Street
San Francisco, CA 94108

Jean Circiello
EPA Library
215 Fremont Street
San Francisco, CA 94105

Government Documents Section
Stanford University
Stanford, CA 94305

Dora Ng
Government Publications
SF State University
1630 Holloway Avenue
San Francisco, CA 94132

Inst. of Govt. Studies
1209 Moses Hall
UC Berkeley
Berkeley, CA 94720

Hastings College of the Law
Library
200 McAllister Street
San Francisco, CA 94102

GROUPS AND INDIVIDUALS

AIA
San Francisco Chapter
790 Market Street
San Francisco, CA 94102

GROUPS AND INDIVIDUALS (cont.)

Steve Anderson
Charter Commercial Brokerage
Market Research Dept.
Two Embarcadero Center, #1860
San Francisco, CA 94111

Harold Yee
ASIAN, Inc.
1670 Pine Street
San Francisco, CA 94109

Alice Suet Yee Barkley
Bennet & Barkley
100 California St., Suite 970
San Francisco, CA 94111

Angleo Siracusa
Bay Area Council
348 World Trade Center
San Francisco, CA 94111

Albert Beck
c/o Geography Department
California State Univ., Chico
Chico, CA 95929

Bendix Environmental
Research, Inc.
1390 Market, #902
San Francisco, CA 94102

James Berg
Dooley, Anderson, Berg
600 Montgomery, 32nd Floor
San Francisco, CA 94111

Tony Blaczek
Finance Dept., Coldwell Banker
1 Embarcadero Center, 23rd Floor
San Francisco, CA 94111

John E. Bonin
Knowlton Realty, Inc.
1 California St., Suite 500
San Francisco, CA 94111

Peter Bosselman
Environmental Simulation Lab.
119 Wurster Hall
UC Berkeley
Berkeley, CA 94720

Roger Boyer Associates
215 Leidesdorf
San Francisco, CA 94111
Attn: Anita

Jonnie T. Jacobs, Esq.
Brobeck, Phleger, Harrison
One Market Plaza
San Francisco, CA 94105

Michael Buck
1333 - 35th Avenue
San Francisco, CA 94122

Jim Buker
SF Muni Coalition
790 Kansas
San Francisco, CA 94107

John Buss
Embarcadero South Investors
850 Montgomery St., #400
San Francisco, CA 94133

David Capron
Lincoln Property Co.
222 Sansome Street
San Francisco, CA 94104

Dale Carlson
369 Pine Street, #800
San Francisco, CA 94104

Kent Soule
Chickering & Gregory
3 Embarcadero Center, 23rd Floor
San Francisco, CA 94111

George Chinn, President
Chinese Chamber of Commerce
730 Sacramento
San Francisco, CA 94108

GROUPS AND INDIVIDUALS (cont.)

Coalition for SF Neighborhoods
Mrs. Dorice Murphy
175 Yukon St.
San Francisco, CA 94114

Joseph Cortiz
2853 - 22nd Street
San Francisco, CA 94110

Calvin Dare
Cushman Wakefield
555 California, #2700
San Francisco, CA 94104

Ernestine De Falco, Pres.
League of Women Voters-Bay Area
477 - 15th Street, Suite 200
Oakland, CA 94612

Alex Diamondidis
58 Varennes
San Francisco, CA 94133

Rita Dorst
RB International Services
9 Boston Ship Plaza
San Francisco, CA 94111

Lloyd Pflueger
Downtown Association
582 Market Street
San Francisco, CA 94105

Downtown Senior
Social Services
295 Eddy Street
San Francisco, CA 94102

Michael V. Dyett
Blayney-Dyett
70 Zoe Street
San Francisco, CA 94103

Leslie deBoer
EPR, Inc.
649 Front Street
San Francisco, CA 94111

Jo Julin
ESA
1291 E. Hillsdale Blvd., Suite 300
Foster City, CA 94404

Patrick Flanagan, Pres.
Fisherman's Wharf Merchants Assn.
c/o Standard Fisheries Corp.
P.O. Box 2232
San Francisco, CA 94126

Farella Braun & Martel
235 Montgomery St.
San Francisco, CA 94104

Connie Parrish
Friends of the Earth
1045 Sansome Street, #404
San Francisco, CA 94111

Grant Dehart
Heritage
2007 Franklin Street
San Francisco, CA 94109

Charles Gill
The Aspen Group West, Inc.
505 Sansome St., Suite 1005
San Francisco, CA 94111

Paul Gordenev, Chairman
Peninsula Commuters Action Comm
1045 Cadillac Way, #208
Burlingame, CA 94010

Annette M. Granucci
Commercial News Publishing Co.
125 Twelfth Street
San Francisco, CA 94103

Gruen,Gruen & Associates
564 Howard Street
San Francisco, CA 94105

James D. Hall
101 Lombard Condominiums
San Francisco, CA 94111

Donald Head & Associates
109 Minna Street, #293
San Francisco, CA 94105

GROUPS AND INDIVIDUALS (cont.)

Robert L. Gibney, Jr.
Heller, Ehrman, White & McAuliffe
44 Montgomery St., 32nd Fl.
San Francisco, CA 94104

Valerie Hersey
Munselle-Brown
950 Battery
San Francisco, CA 94111

Sue Hestor
4536 - 20th Street
San Francisco, CA 94114

Arthur B. Hill, VP
Administrative Services
CSAA
100 Van Ness Ave.
San Francisco, CA 94102

Carl Imparato
1205 Garfield
Albany, CA 94706

Gordon Jacoby
Jefferson Associates
683 McAllister Street
San Francisco, CA 94102

James Jefferson
SF Black Business Chamber of Commerce
683 McAllister St.
San Francisco, CA 94102

Dick Johnson, Chairman
YMCA Board of Directors
57 Post St., #801
San Francisco, CA 94104

Elmer Johnson, Exec. VP
Bldg. Owners & Managers Assn.
690 Market St.
San Francisco, CA 94104

David W. Jones, Jr.
Inst. for Transportation Studies
Univ. of California
109 McLaughlin Hall
Berkeley, CA 94720

Jones Lang Wootton
One Embarcadero Center, Suite 710
San Francisco, CA 94111

Marc Kasky, Exec. Dir.
Fort Mason Foundation
Fort Mason Center, Bldg. A
San Francisco, CA 94123

Robert Fan, Lee & Fan
Architecture & Planning, Inc.
580 Market Street, Suite 300
San Francisco, CA 94104

Brent Kato
Legal Assistance to the Elderly
333 Valencia Street, 2nd Floor
San Francisco, CA 94103

Carol Lester
Lawyers Title Company of SF
300 Montgomery St., Suite 1135
San Francisco, CA 94104

Enid Lim
Chinatown Trip
615 Grant Ave., 2nd Floor
San Francisco, CA 94108

Barry Livingston
Urban Center Development Ltd.
One Embarcadero Center, Suite 2216
San Francisco, CA 94111

Arthur L. Lloyd, Dir.
Corporate Communications
Amtrak
221 Pine St., Suite 500
San Francisco, CA 94104

Doug Longyear
Finance Dept. Coldwell Banker
1 Embarcadero Center, 23rd Floor
San Francisco, CA 94111

GROUPS AND INDIVIDUALS (cont.)

Michael Louie
1312 Anza
San Francisco, CA 94118

Toshio Magamura, Gen. Mgr.
Japanese Chamber of Commerce
312 Sutter, #408
San Francisco, CA 94108

Rolf Wheeler
Marathon U.S. Realties, Inc.
595 Market St., Suite 1330
San Francisco, CA 94105

Robert Meyers Associates
582 Market Street, Suite 1208
San Francisco, CA 94104

Leland S. Meyerzove
KPOO - FM
P.O. Box 6149
San Francisco, CA 94101

Charles Hall Page & Associates
364 Bush Street
San Francisco, CA 94104

Susan Pearlstine
Pillsbury, Madison & Sutro
P.O. Box 7880
San Francisco, CA 94120

Gloria Root
Planning Analysis & Dev.
530 Chestnut Street
San Francisco, CA 94133

Mrs. G. Bland Platt
339 Walnut Street
San Francisco, CA 94118

Deborah McNamee
Research & Decisions Corp.
375 Sutter Street, Suite 300
San Francisco, CA 94108

David P. Rhoades
120 Montgomery Street, Suite 1600
San Francisco, CA 94104

Norman Rolfe
2233 Larkin, #4
San Francisco, CA 94109

Mrs. H. Klussman, Pres.
San Francisco Beautiful
41 Sutter Street
San Francisco, CA 94104

Stanley Smith
San Francisco Building & Construction
Trades Council
400 Alabama Street, Room 100
San Francisco, CA 94110

Richard Morten
SF Chamber of Commerce
465 California Street
San Francisco, CA 94105

G. Kirkland, Exec. Director
SF Conv. & Visitors Bureau
201 - 3rd Street, Suite 900
San Francisco, CA 94103

Bill Wright, Pres.
SF Council of District
Merchants Assn.
2320 Judah
San Francisco, CA 94122

SF Ecology Center
13 Columbus Avenue
San Francisco, CA 94111

J. Robert Snyder, Gen. Mgr.
San Francisco Hotel Assn.
323 Geary, #611
San Francisco, CA 94102

San Francisco Junior
Chamber of Commerce
251 Kearny Street
San Francisco, CA 94104

Bernard Speckman
San Francisco Labor Council
1855 Folsom Street
San Francisco, CA 94103

GROUPS AND INDIVIDUALS (cont.)

San Francisco Organizing Project
1208 Market St.
San Francisco, CA 94102

Mike McGill
San Francisco Planning &
Urban Research Association
312 Sutter Street
San Francisco, CA 94108

David Jones
San Franciscans for Reasonable Growth
241 Bartlett
San Francisco, CA 94110

Frank Noto
San Francisco Forward
375 Sutter Street, #400
San Francisco, CA 94108

Tony Kilroy
San Francisco Tomorrow
942 Market Street, Room 505
San Francisco, CA 94102

John Sanger & Associates
2340 Market Street
San Francisco, CA 94114

Senior Escort Program
South of Market Branch
814 Mission Street
San Francisco, CA 94103

David Wannerstrom
Sierra Club, Bay Chapter
781 O'Farrell, #301
San Francisco, CA 94109

Becky Evans
Sierra Club
530 Bush Street
San Francisco, CA 94108

Richard Sklar
1 Presidio Terrace
San Francisco, CA 94118

South of Market Alliance
74 Langton Street
San Francisco, CA 94103

Hartmut Gerdes
Square One Film & Video
725 Filbert St.
San Francisco, CA 94133

Wayne Stiefvater
Appraisal Consultants
701 Sutter Street, 2nd Floor
San Francisco, CA 94109

Gardner Still
HMS Associates
1259 Folsom
San Francisco, CA 94103

John Elberling
TODCO
230 Fourth Street
San Francisco, CA 94103

Rod Teter
Cahill Construction Co.
425 California Street, Suite 2300
San Francisco, CA 94104

Timothy Tosta
333 Market Street, #2230
San Francisco, CA 94105

Jeff Vance
Campeau Corporation
681 Market Street
San Francisco, CA 94105

Kathy Van Velsor
19 Chula Lane
San Francisco, CA 94114

Steven Weicker
899 Pine Street, #1610
San Francisco, CA 94108

Howard Wexler
235 Montgomery, 27th Floor
San Francisco, CA 94104

GROUPS AND INDIVIDUALS (cont.)

Eunice Willette
1323 Gilman Ave.
San Francisco, CA 94124

Leslie Yee
1531 Powell Street
San Francisco, CA 94133

Marie Zeller
Whisler-Patri
590 Folsom Street
San Francisco, CA 94105

Robert & Nancy Katz
2 Whiting Street
San Francisco, CA 94133

Donna Davis
RailFax, Inc.
215 S.W. Hooker
Portland, OR 97201

D.J. Smith Associates
1121 L Street, Suite 510
Sacramento, CA 95814

Jon Twichell, Chair
CCREEF
P.O. Box 2115
San Francisco, CA 94126

RELOCATION IMPACT LIST

Manager
Metro Park Market Plaza
Garage
Howard & Steuart Streets
San Francisco, CA 94105

Manager
Metro Park #4
255 The Embarcadero
San Francisco, CA 94105

Manager
Metrol Park #36
190 Beale
San Francisco, CA 94105

Manager Metro Park #94
156 First Street
San Franicsco, CA 94105

Manager
Carl Byoir & Associates
181 Fremont
San Francisco, CA 94105

Manager
Ray Corporations
181 Fremont
San Francisco, CA 94105

Manager Western Administration
181 Fremont
San Francisco, CA 94105

Manager
PM&O Lines Navigation Co.
181 Fremont
San Franicsco, CA 94105

Manager
Fremont House Restaurant
193 Fremont
San Francisco, CA 94105

Manager
The Old Corner Bar & Grill
199 Fremont
San Francisco, CA 94105

Manager
Fritzi of California
199 First Street
San Francisco, CA 94105

General Manager
Crowley Maritime Corp.
One Market Plaza
San Francisco, CA 94105

General Manager
Miller Freeman Publications
500 Howard
San Francisco, CA 94105

Manager
Pacific Fulfillment Systems
500 Howard
San Francisco, CA 94105

RELOCATION IMPACT LIST (cont.)

Manager
Parrott & Co.
500 Howard
San Francisco, CA 94105

Manager
Wente Brothers
500 Howard
San Francisco, CA 94105

Manager
Bay Bridge Garage
524 Howard
San Francisco, CA 94105

Manager
Cling Peach Advisory Board
524 Howard
San Francisco, CA 94105

Director, College of Special
Programs
Golden Gate University
530 Howard
San Francisco, CA 94105

Manager
James Weber & Associates
530 Howard
San Francisco, CA 94105

Manager
Howard Hawthorne Company
530 Howard
San Francisco, CA 94105

Manager
Greg Bently Design
530 Howard
San Francisco, CA 94105

Manager
Peter Culley & Associates
530 Howard
San Francisco, CA 94105

Manager
Architectural Management Services
530 Howard
San Francisco, CA 94105

Manager
Venture Graphics
540 Howard
San Francisco, CA 94105

Manager
Graphic Arts Engraving Co.
35 Natoma
San Francisco, CA 94105

Manager
Trask & Squier Co.
39 Natoma
San Francisco, CA 94105

Manager
Skelton Photography
272 Main St.
San Francisco, CA 94105

Manager
Aikins, Marling & Morris, Inc.
276 Main St.
San Francisco, CA 94105

Manager
Office Environments, Inc.
2 Bryant
San Francisco, CA 94105

Manager
Embarcadero Garage & Pacific
Truck Maintenance
2 Brannan
San Francisco, CA 94105

Manager
Golden State Marine, Inc.
1 Townsend
San Francisco, CA 94105

RELOCATION IMPACT LIST (cont.)

Manager
Drive-Up Self Storage
P.O. Box 77293
San Francisco, CA 94107

MEMBERS OF THE:

Policy Control Committee

Technical Advisory Committee

Consultant Team

XI. LIST OF PREPARERS AND PERSONS CONSULTED

CALIFORNIA DEPARTMENT OF TRANSPORTATION, San Francisco, California. Responsible for preliminary engineering and managing environmental document preparation. Lead agency for the EIR. Represented on the Policy Control Committee. Key personnel include:

Russell D. Sayre	:	Project Manager
William B. Chastain	:	Assistant Project Manager
Robert H. Jahrling	:	Deputy District Director, Planning and Programming District 4 (TAC member)
Robert W. Crockett	:	Chief, Peninsula Commute Service, District 4 (TAC member)
Lincoln Chu	:	Chief, Project Development, District 4 (TAC member)
Darnall W. Reynolds	:	Chief, Environmental Analysis, District 4 (TAC member)
Mara K. Melandry	:	Senior Environmental Planner

CALIFORNIA HIGHWAY PATROL, San Francisco, California. Represented on the Technical Advisory Committee. Key personnel include:

Capt. Charles Weaver	:	San Francisco Area Commander (TAC member)

METROPOLITAN TRANSPORTATION COMMISSION, Oakland, California. Represented on the Policy Control Committee, and assisted in the review and preparation of the EIR. Key personnel include:

Paul Maxwell	:	Planning Manager (TAC member)
Dennis Fay	:	Associate Planner (TAC member)

CITY AND COUNTY OF SAN FRANCISCO, represented on the Policy Control Committee, and assisted in the review and preparation of the EIR. Key personnel include:

Douglas Wright	:	Director of Planning and Development, Public Utilities Commission (TAC member)
Alvin D. James	:	Chief of Comprehensive Planning, Department of City Planning (TAC Member)
Peter Straus	:	Director of Planning, San Francisco Municipal Railway (Muni) (TAC member)
William Marconi	:	Chief, Bureau of Engineering, Department of Public Works (TAC member)
Luther Freeman	:	Transit Planner, Muni (TAC member)

Scott Shoaf	:	Traffic Engineer, Department of Public Works (TAC member)
Maria Vermiglio	:	Transit Planner, Muni (TAC member)
Gail Bloom	:	Department of City Planning
Chi Hsin Shao	:	Transit Planner, Department of City Planning
Ronald Niewiarowski	:	Transit Planner, Planning and Development, Public (Utilities Commission

SAN FRANCISCO REDEVELOPMENT AGENCY

Robert Isaacson	:	Project Engineer, Rincon Point/South Beach Redevelopment Project (TAC member)

PORT OF SAN FRANCISCO

Dr. Randall Rossi	:	Environmental Planning and Regulations Coordinator (TAC member)

PARSONS BRINKERHOFF QUADE & DOUGLAS, INC., San Francisco, California. Responsible for consultant project management as well as for taking the lead in alternatives definition and evaluation, engineering and cost estimating, and for providing technical support in other areas. Key personnel and their titles include:

Walter Kudlick	:	Project Manager
Gene Altshuler	:	Deputy Project Manager
C.K. (Tom) Lu	:	Deputy Project Manager
Gene Holit	:	Chief Civil Engineer
Ross Maxwell	:	Transportation Planner
Yair Eisenberg	:	Structure Engineer

DKS ASSOCIATES, Oakland, California. Responsible for traffic, circulation and parking analyses. Key personnel and their titles include:

Richard Sauve	:	Project Manager
Hans Korve	:	Participating Principal
Michael Kennedy	:	Assistant Project Manager
Ransford McCourt	:	Assistant Project Manager
Mike Aronson	:	Project Engineer
Steve Lowenf	:	Project Engineer
Rick Dowling	:	Project Engineer
Ingor Knox	:	Graphics
Ashley Long	:	Graphics

ENVIRONMENTAL IMPACT PLANNING CORPORATION, San Francisco, California. Responsible for coordinating the EIR preparation and for conducting institutional considerations, land use and physical environmental analyses. Key personnel and their titles include:

Doug Donaldson	:	Project Director
Arthur Sullivan	:	Project Manager
Liz Hill	:	Assistant Project Manager
Charles Setchell	:	Assistant Project Manager
Michael Dunham	:	Production Supervisor
Barbara Johnson	:	Word Processor
Lisa Lefholz	:	Graphics Supervisor

Chris FitzGerald, Doug Svensson, Bill Ziebron, George Burwasser, Rick Pollack, Ric Villasenor, Lilia Medina, Eleanor Ross, Cathy Galloway Brown, Michael Davis, Francis Swanstrom, Jay B. Laws, Damon Gay, Gabriel Lasa

ROMA, San Francisco, California. Responsible for assessing urban design impacts. Key personnel and their titles include:

Boris Dramov	:	Project Manager
Jay Claiborne	:	Project Designer
Jim Adams	:	Project Designer

AILEEN C. HERNANDEZ ASSOCIATES, San Francisco, California. Responsible for community involement and citizen participation. Key personnel and their titles include:

Aileen Hernandez	:	Project Manager
Jacqueline Bradford	:	Associate Project Manager
Patsy G. Fulcher	:	Associate Project Manager

EDWARD M. ROSE ASSOCIATES, San Francisco, California. Responsible for social impact analysis. Key personnel and their titles include:

Edward M. Rose	:	Project Manager

THERESA HUGHES & ASSOCIATES, Oakland, California. Responsible for the project's economic impact analysis. Key personnel and their titles include:

Theresa Hughes	:	Project Manager

CHARLES SALTER & ASSOCIATES, San Francisco, California. Subconsultants to EIP, responsible for noise impacts analysis. Key personnel and their titles include:

Rick Illingworth	:	Project Manager

DAVID CHAVEZ, CONSULTING ARCHAEOLOGIST, Mill Valley, California. Subconsultants to EIP, responsible for archaeological analysis. Key personnel and their titles include:

David Chavez	:	Project Manager

WILSON AND PORTER ENGINEERING, San Francisco, California. Subconsultants to Parsons Brinkerhoff. Assisted with Civil Engineering. Key personnel and their titles include:

Rodney Porter	:	Project Manager

PERSONS CONSULTED

CITY AND COUNTY OF SAN FRANCISCO

San Francisco Port Commission
Ferry Building
San Francisco, CA 94111
Roger Peters, Traffic Manager

Port of San Francisco
Ferry Building
San Francisco, CA 94111
Gary Green, Traffic Analyst

San Francisco Municipal Railway
Planning Division
949 Presidio Avenue
San Francisco, CA 94115
Maria Vermiglio, Transit Planner

San Francisco Department of Public Works
Street & Highway Division
45 Hyde Street, Room 212
San Francisco, CA 94102
Richard Cunningham, Superintendent of Street Repair

San Francisco Water Department
Engineering Branch
425 Mason Street
San Francisco, CA 94102
A. Montanari, Engineer

San Francisco Clean Water Program
150 Hayes Street
San Francisco, CA 94101
Don Bierrer, Executive Director
Rhonda Robinson, Environmental Review Coordinator
M. Rombanis, Assistant Superintendent, Catch Basin Maintenance
Harriet Sakuma, Don Hayashi, Steve Laughlin

Other

Metropolitan Transportation Commission
101 8th Street
Oakland, CA 94607
Sarah Makusick, Planner
Dennis Fay, Associate Planner

California Department of Fish and Game
Menlo Park Regional Office
411 Burgess Drive
Menlo Park, CA 94025
Bob Tasto, Marine Fisheries Biologist

California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607
Theresa Rumjahn, Biologist
Charles Robinson, Engineer

San Mateo Transit District
400 South El Camino Real
San Mateo, CA 94402
Gregory Kipp, Planner

Dames & Moore, Geotechnical Consultants
500 Sansome Street
San Francisco, CA 94111
Eric McHuron

APPENDIX A

Summary of Goals, Objectives, and Measures
Adopted for the I-280 Transfer Concept Program

APPENDIX A

I-280 TRANSFER CONCEPT PROGRAM

GOALS, OBJECTIVES AND MEASURES

(Not in Any Order of Priority)

TRANSPORTATION SERVICE

GOAL: Improve Local and Regional Transportation Access Through, To and Distribution Within the Study Area.

Objective: **Minimize travel time and costs.**

Measure 1: Relative PM peak period transit travel times, including transfers, from representative study area locations to study area cordon points such as: existing SP Depot, BART Stations and Transbay Terminal.

Measure 2: Relative PM peak period transit travel times, including transfers, from cordon points to cordon points.

Measure 3: Relative PM peak period transit travel times, including transfers, between representative study area locations.

Measure 4: Relative PM peak period auto travel times from representative study area locations to study area cordon points such as: Route 280, U.S. 101, I-80, Van Ness Avenue.

Measure 5: Relative PM peak period auto travel times from cordon points to cordon points.

Measure 6: Relative PM peak period auto travel times between representative study area locations.

Note that since travel time and cost are closely related, travel time will also be used to indicate travel cost in this assessment.

Objective:	**Provide facilities to accommodate travel — by public transportation, automobile, bicycles, pedestrians and other modes — when and where appropriate in the study area.**
Measure 1:	Peak period transit corridor and screenline passenger capacity and volume-to-capacity ratios.
Measure 2:	Number of surface street intersections operating at Level of Service "E" or "F" during AM and PM peak periods, and the length of peak period at each intersection.
Measure 3:	Extent of queuing during PM peak period relative to Null Alternative.
Measure 4:	Relative bicycle and pedestrian accessibility and impediments based on availability of bicycle paths, capacity on transit to carry bicycles, storage facilities, pedestrian walkways and grade-separated pedestrian crossings at critical locations.
Measure 5:	Impact on emergency service based on delay at intersections.
Objective:	**Provide facilities for the safe and efficient movement of goods and commodities.**
Measure:	Assessment based on volume-capacity ratios, auto travel times, local street circulation, and anticipated locations of major generators/attractors of truck trips.
Objective:	**Maximize the attractiveness and use of public transport.**
Measure 1:	Relative PM peak period transit travel times, including transfers, from representative study area locations to study area

cordon points such as: existing SP Depot, BART Stations and Transbay Terminal.

Measure 2: Estimated transit mode split (corridor, study area cordon).

Measure 3: Hours and frequency of service.

Measure 4: Number of transfers required for representative transit trips.

Measure 5: Peak period load factor.

Objective: **Develop a coordinated, balanced transportation system with intermodal transfer facilities at appropriate locations.**

Measure 1: Estimated transit mode split (corridor, study area cordon).

Measure 2: Assessment based on peak period corridor volume-capacity ratios (transit vs. auto); number/type of transfers from regional systems to representative study area locations.

Objective: **Maintain and enhance transit operations.**

Measure 1: Assessment based on amount of transit service in exclusive or priority ROW and volume-capacity ratios at street intersections along major surface transit routes (Market and Mission).

Measure 2: Assessment based on estimated changes in existing transit operations (non-revenue miles, round trip time, vehicle requirements during peak and base periods).

Objective: **Give priority to public transit as a means of meeting transportation needs.**

Measure 1: Increase in transit service coverage.

Measure 2: Increase in transit line and terminal capacities.

URBAN DESIGN AND LAND USE

GOAL: Maintain and Enhance the Scenic, Recreational and Cultural Values of the Waterfront and its Desirability as a Place to Live, Work and Visit.

Objective: Enhance the integrity of the Embarcadero as a transition zone between land and water, and as an expression of the continuity of the shoreline.

Measure 1: Visual continuity along the Embarcadero.

Measure 2: Continuity of the cross section throughout its length.

Measure 3: Attractiveness of the corridor as a place to tarry.

Objective: Create a scenic waterfront boulevard (regardless of the disposition of the elevated freeway) which accommodates a variety of modes of transportation as well as linear recreational activities such as jogging, bicycling and walking.

Measure 1: Comfort, safety and convenience for recreational uses along the Embarcadero from Fort Mason to China Basin.

Measure 2: Quality of rider experience.

Measure 3: Speed and volume of traffic.

Measure 4: Physical character and scale of the Boulevard.

Measure 5: Comprehensibility and clarity of intersections and interchanges.

Objective: Enhance views and public access to the Bay.

Measure 1: Actual and perceived distance between inland areas and water's edge.

Measure 2: Unobstructed views of the Bay from cross streets and significant public spaces.

Measure 3: Views of the city from the Bay.

Measure 4: Pedestrian comfort, safety and convenience in crossing the Embarcadero corridor.

Measure 5: Physical linkages to civic spaces, recreational opportunities and destination points.

Objective: **Strengthen the viability of existing uses and maintain and enhance development opportunities in conformance with adopted policies, in particular the creation of the Rincon Point South Beach redevelopment project and Rincon Hill residential neighborhoods.**

Measure 1: Number, size and shape of developable parcels created or enhanced.

Measure 2: Access (e.g. auto, truck, transit) to existing uses and potential development sites.

Measure 3: Extent to which the image of the area is enhanced or degraded.

Measure 4: Extent to which the environmental quality (e.g. air, light & noise) is enhanced or degraded.

Measure 5: Extent to which views (e.g. Bay and City) are enhanced or degraded.

Measure 6: Extent to which amenities (e.g. parks, open space) and supporting activities (e.g. neighborhood shopping) are enhanced or degraded.

Objective: **Enhance the prominence of the historic Ferry Building as a terminus to Market Street, a transportation interchange and gateway between land and water.**

Measure 1: View to Ferry Building down Market Street, along the Embarcadero, from surrounding areas and from the Bay.

Measure 2: Ease of pedestrian crossing from Market Street to the Ferry Building.

Measure 3: Ease of transfer from public transit on Market Street to public transit on the Embarcadero corridor and to ferry boats.

Measure 4: Quality of pedestrian environment in front of the Ferry Building and at the foot of Market Street.

Objective: **Preserve and enhance historic, cultural and recreational resources.**

Measure 1: Maintenance and enhancement of historic buildings and districts.

Measure 2: Maintenance and enhancement of existing and proposed parks, promenades and open water areas.

Measure 3: Maintenance and enhancement of cultural recreational activities.

Objective: **Locate long-term parking away from the water's edge and as far inland as possible.**

Measure: Size and location of long-term parking facilities removed or required.

ENVIRONMENTAL ASPECTS

GOAL: Preserve and Enhance the Environment

Objective: **Conserve land, energy (particularly petroleum-based fuels) and other non-renewable resources.**

Measure 1: Right-of-way required for transportation facilities and air right/joint use opportunities created.

Measure 2: Trips diverted (from autos to transit) and induced translated into gas saved relative to No Project Alternative.

Measure 3: Construction energy requirements.

Measure 4: Secondary effects of growth on land use.

Objective: **Minimize the need for core area automobile traffic and parking facilities by increasing vehicle occupancy, use of public transit and by encouraging the use of peripheral parking facilities.**

Measure 1: Number of auto trip ends generated in and attracted to the study area relative to the No Project Alternative.

Measure 2: Location and capacity of peripheral parking relative to demand.

Measure 3: Frequency of connecting transit services.

Measure 4: Relative travel time (auto vs. transit, including transfer time).

Measure 5: Facilities and services provided which tend to increase auto occupancy in terms of availability of carpool/vanpool programs and facilities, HOV lanes on freeways and city streets.

Objective: Minimize or mitigate potential adverse environmental impacts, including noise and air quality, of transportation facilities and services.

Measure 1: Extent of residential and/or business displacement or disruption, if any.

Measure 2: Extent of potential archaeological, historic and parkland impacts, if any.

Measure 3: Trips diverted (from auto to transit) and induced translated into amount of pollutants reduced or added relative to the Null Alternative.

Measure 4: Number and size of locations where air quality standards are exceeded ("hot spots" of significant air pollution).

Measure 5: The level of carbon monoxide which could result from Embarcadero Freeway removal by lowering emission generators from the elevated freeway structure to ground level.

Measure 6: Number of specific areas where the respective elements could significantly change the noise environment, the extent and intensity of such changes and the number of people affected by such changes.

Measure 7: The relative extent of construction disruption.

Measure 8: Qualitative assessment of any changes in water quality likely to result from each alternative.

Measure 9: Assessment of the barrier effect of heavily traveled corridors.

COST AND COST-EFFECTIVENESS

GOAL: Develop a Transportation System which is Cost-Effective and Efficient in Terms of Benefits Obtained for the Investments Required.

Objective: **Make the best use of existing facilities by protecting and capitalizing on existing transportation system investments.**

Measure 1: Assessment of the use of existing facilities based on volume/capacity ratios, person miles carried, length of peak periods and the extent of any unused capacity.

Measure 2: Amount of new construction for each facility type.

Ojective: **Seek least cost solutions to transportation needs, considering all aspects of direct and indirect costs.**

Measure 1: Capital costs.

Measure 2: Agency, inflation and miscellaneous costs.

Measure 3: Operating costs.

Measure 4: Annual operating subsidy per passenger (transit and auto).

Objective: **Seek maximum return in terms of user and community benefits from investments in transportation.**

Measure 1: Total annualized capital costs and operating costs.

Measure 2: Marginal annualized capital costs and operating costs per marginal passenger (relative to the No Project Alternative).

Measure 3: Qualitative assessment of the benefits or losses associated with changes in land use and lifestyle.

Objective: Eliminate unnecessary duplication among transportation systems and providers of transportation services; reduce or eliminate needless excess capacity.

Measure 1: The extent of unnecessary duplications in facility and service.

Measure 2: Assessment based on volume/capacity ratios, peak period transit load factors, and the length of peak periods.

FINANCIAL FEASIBILITY

GOAL: Develop Transportation Systems Based on a Realistic Estimate of Resources: Encourage Cost-Sharing by the Private Sector

Objective: Develop transportation plans which can be staged in a manner consistent with current and probable future capital and operating funding availability.

Measure 1: Suitability for staging (construction and operations).

Measure 2: Flexibility to expand to accommodate future growth.

Measure 3: Estimated future funding (total and local share) availability; extent of estimated shortfall, if any.

Measure 4: Transit and auto operating subsidy per passenger carried.

Objective: Create maximum potential for private sector cost-sharing in transportation capital and operating costs in proportion to benefits received.

Measure: Anticipated potential for joint development and/or assessment district financing and/or other type of private sector cost-sharing.

EQUITY CONSIDERATIONS

GOAL: Provide Transportation Services that are Designed to Meet the Needs of All Segments of the Population

Objective: Enhance the mobility of the transportation disadvantaged.

Measure: Travel time and accessibility changes for selected areas with concentrations of transportation disadvantaged groups, by transit and by auto.

Objective: Develop transportation plans which do not unfairly distribute benefits or costs among various groups, consistent with other objectives sought.

Measure: Qualitative assessment of expected distribution of benefits and costs, by geographic areas and by demographic groups.

Objective: Minimize the displacement or disruption of minority, low-income and other communities.

Measure 1: Anticipated amount of short-term (construction) and long-term (operational) displacement/disruption of residential, employment and other areas and nature of groups most affected.

Measure 2: Degree of interference with, or improvement of, pedestrian, transit, automobile and emergency/service vehicle circulation patterns.

ECONOMIC AND SOCIAL FACTORS

GOAL: Provide a Transportation System that Stimulates Social and Economic Revitalization of Existing Development in a Manner Consistent with Other Local and Regional Planning Efforts

Objective: Minimize adverse impacts on existing employment opportunities.

Measure: Assessment of number, types and sizes of employers adversely impacted.

Objective: Provide a transportation system which will encourage private investment and the development of commercial activities in the study area that will create new jobs and contribute significantly to the City's economic vitality.

Measure 1: Assessment of land use change potential favorable or unfavorable to economic development.

Measure 2: Changes in accessibility/travel times for movements of people and goods.

Measure 3: Loss of tax base due to displacement and/or accessibility changes.

Objective: Provide access to port facilities and water transportation for both people and goods.

Measure: Degree of enhancement/interference with the circulation of pedestrians and vehicles to and from the waterfront based on the number and location of potential vehicle to vehicle and vehicle to pedestrian conflicts.

Objective: Develop a transportation system whose facilities are compatible with adjacent land uses and which are consistent with and will help support planned regional development.

Measure 1: Degree of support/conflict with adopted local and regional development plans.

Measure 2: Consistency with other adopted local and regional transportation improvement proposals.

Objective: Provide transportation facilities which help reinforce sense of community identity, improve linakages among interrelated activities and provide focus for community activities.

Measure: Assessment of impacts on circulation patterns and land uses at the local neighborhood scale.

PUBLIC PARTICIPATION AND COMMUNITY INVOLVEMENT

GOAL: Develop Transportation Plans Giving Full Consideration to the Opinions of All Segments of the Public

Objective: Seek the active involvement in the EIR study of local groups, the general public at large, agency staffs and elected officials at the city, region, state and federal levels.

Measure: Synthesis (stratified as required) of input received at public meetings, interviews with community and business leaders, workshops, presentations and other elements of the community participation program.

Objective: Consider the opinions of visitors and others less likely to become involved in the EIR study under normal circumstances.

Measure: Results of "outreach" contacts with identified target groups.

INSTITUTIONAL

GOAL: Define a Set of Transportation Projects Acceptable to the City and County of San Francisco, Metropolitan Transportation Commission and California Department of Transportation as Reflected in Their Goals and Objectives*

Measure: The degree of achievement of institutional goals and objectives will be assessed using the applicable measures selected for other goals and objectives of the study and the opinions of each institution based on their independent assessment.

A summary of federal, state, regional, and City goals and objectives related to I-280 Transfer Concept Program can be found in Appendix D of the Phase I Final Report.

APPENDIX B

Initial Long List of I-280 Transfer Concept
Program Alternatives

INITIAL LONG LIST OF I-280 TRANSFER CONCEPT PROGRAM ALTERNATIVES

	ALTERNATIVES																				
ELEMENTS/TREATMENTS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
I. I-280 TOUCH DOWN																					
1. Entry Between 3rd & 4th		•	•	•			•	•			•	•	•		•				•	•	
2. Entry/Exit @ 2nd & King					•	•			•	•						•	•				
3. Maintain Existing	•																				
4. Pull Back to 6th St.														•							
5. Pull Back & Connect with Berry/King																		•			•
IIA. EMBARCADERO FREEWAY																					
1. Remove, Beale to Broadway		•			•	•								•							
2. Remove & Add Entry/Exit near Folsom/Spear			•	•													•	•	•	•	
3. Maintain Existing	•						•	•	•	•	•	•	•								•
4. Recycle for Other Uses															•	•					
IIB. EMBARCADERO SURFACE ROAD																					
1. Reconstruct, 4-lane		•	•		•		•	•	•	•				•	•	•	•	•	•	•	•
2. Reconstruct, 6-lane						•															
3. Reconstruct, 4/6 Split				•																	
4. Maintain Existing	•										•	•	•								
III. MUNI METRO EXTENSION																					
1. Embarcadero Station to SP Depot		•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•			•
2. PCS Extension to Downtown													•						•		
3. Neither Extension	•																				
4. Both Extensions																				•	
IV. MUNI E-LINE STREETCAR																					
1. Fort Mason to SP Depot		•	•	•	•	•	•		•		•			•		•	•	•			•
2. Fort Mason to F-Line Interface								•		•		•	•		•				•	•	
3. No E-Line	•																				
V. STREET & RAMP MODIFICATION																					
1. I-280/Embarcadero Area		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2. None	•																				
VI. INTERCEPT PARKING																					
1. I-280/Embarcadero Area		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2. None	•																				
VII. TSM IMPROVEMENTS ALONG NORTHEASTERN WATERFRONT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

APPENDIX C

I-280 Transfer Concept Program
Study Documents

APPENDIX C: STUDY DOCUMENTS

A number of Working Papers were prepared during the second phase of the Draft EIR preparation process. These served to document interim study findings as the project progressed and provided the study's Technical Advisory Committee, the Policy Control Committee and others with early reporting on the study and its findings. In general, these documents were issued in draft form. TAC members provided written conmments on the draft and written responses were prepared for the purposes of incorporation in subsequent work products as appropriate and to complete the project files. The Phase II Final Report integrates these earlier documents and represents the latest study results as of the date of its preparation.

The most important document arising from this I-280 Study will be the Draft EIR, which constitutes the study's main product. Its preparation includes updating it as required to make sure that it contains the latest study results. Consequently, the Draft EIR supersedes the contents of the interim working papers to the extent that there are any differences among them. Since the earlier publications contain much valid and useful information, however, they are listed below as a reference source for those seeking additional material resulting from the I-280 Study.

Task	Type and Description of Document	Date
1.4.7	WP* - Evaluation Methodology for Phases I & II	June 18, 1982
1.5.6	Final WP - Travel Demand Forecasting/Analysis	July 8, 1983
	Phase I Final Report	Dec. 31, 1982
2.1.1	WP - Narrative Description & Sketch Plans of Alternatives (Responses to TAC comments on WP are included in a response TM under Task 2.2.1)	Nov. 24, 1982
2.2.1a	WP - Conceptual Designs & Engineering Feasibility for Alternatives I, II & II	Dec. 31, 1982
2.2.1b	WP - Conceptual Designs & Engineering Feasibility for Alternatives IV, V & VI	Feb. 9, 1983
2.1.1 & 2.2.1	WP - Narrative Description, Conceptual Designs & Engineering Feasibility for Alternative IVA	July 29, 1983

2.1.1 & 2.2.1	WP - Narrative Description, Conceptual Designs & Engineering Feasibility for Alternative VA	Aug. 5, 1983
	TM** - Responses to Comments on WPs for Alternatives I, II, III, IV, V & VI	Aug. 16, 1983
2.2.2	Final WP - Transportation Performance Measures (Alts. I, II, III, IV, V & VI)	July 1983
2.2.2	WP - Transportation Performance Measures for Alternative IVA	August 1983
2.2.2	WP - Transportation Performance Measures for Alternative VA	August 1983
2.2.3a	WP - Soils, Seismicity, Geology; Ecology	Dec. 30, 1982
2.2.3b	WP - Noise & Vibration, Hydrology & Water Quality	Feb. 8, 1983
2.2.3c	WP - Air Quality, Energy	Feb. 14, 1983
	TM - Responses to Comments on WPs 2.2.3a, 2.2.3b, 2.2.3c	July 11, 1983
2.2.3	WP - Memorandum on Alternative IVA (comprising Physical, Environment, Land Use, Construction and Institutional Considerations)	Aug. 15, 1983
2.2.3	WP - Memorandum on Alternative VA (comprising Physical, Environment, Land Use, Construction and Institutional Considerations)	Sept. 1983
2.2.4a	WP - Social - Land Use	Jan. 28, 1983
2.2.4	WP - Social	Apr. 13, 1983
	TM - Responses to Comments on WP 2.2.4a	July 11, 1983
	TM - Responses to Comments on WP 2.2.4	Aug. 4, 1983
2.2.4	WP - Social - Evaluation of Alternative VA	Sept. 7, 1983
2.2.4	WP - Social - Evaluation of Alternative IVA	Sept. 15, 1983
2.2.5-7	WP - Historic, Cultural and Recreational Resources; Urban Design Consideration; Visual Impacts	Feb. 21, 1983
2.2.5-7	Addendum to the above WP, including responses to TAC comments	June 17, 1983
2.2.5-7	WP - Evaluation of Alternative IVA	Aug. 3, 1983
2.2.5-7	WP - Evaluation of Alternative VA	Aug. 17, 1983

2.2.8	WP - revised version of the above WP, including public acceptability assessment of Alternative IVA	July 8, 1983
2.2.8	WP - Public Acceptability Assessment of Alternative VA	July 29, 1983
2.2.9	WP - Construction	March 25, 1983
	TM - Responses to Comments on the above WP	July 11, 1983
	(Construction impacts for Alternatives IVA and VA are included in the TM for the two alternatives under Task 2.2.3)	
2.2.10a	WP - Capital Improvement Costs for Alternatives I, II & III	Jan. 21, 1983
2.2.10b	WP - Capital Improvement Costs for Alternatives IV, V & VI	Feb. 18, 1983
2.2.10c	WP - Annual Operating Costs for Alternatives I, II, III, IV, V & VI	Apr. 5, 1983
	TM - Responses to Comments on WPs 2.2.10a, b, c; including revised capital and annual operating cost estimates for Alternatives I, II, III, IV, V & VI	Aug. 10, 1983
2.2.10	WP - Capital Improvement and Annual Operating Costs for Alternative IVA	July 29, 1983
2.2.10	WP - Capital Improvement and Annual Operating Costs for Alternative VA	Aug. 5, 1983
2.2.11	WP - Economic Analysis of Alternatives IVA & VA	Oct. 14, 1983
2.2.12	WP - Revised version of the above WP, including Alternatives IVA & VA	Oct. 1983
2.2.13	WP - Institutional Considerations	Dec. 30, 1982
	TM - Responses to comments on the above WP	July 11, 1983
	(Institutional considerations for Alternatives IVA & VA are inlcuded in the TM for the two alternatives under Task 2.2.3)	
2.2.14	WP - Achievement of Goals & Objectives	Nov. 1983
	Phase II Final Report	Nov. 1983

---

*WP = Working Paper
**TM = Technical Memorandum

APPENDIX D

Background Noise Information

APPENDIX D

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

This section provides background information to aid in understanding the technical aspects of this report.

Three dimensions of environmental noise are important in determining subjective response. These are:

a. the intensity or level of the sound

b. the frequency spectrum of the sound

c. the time-varying character of the sound

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or Hertz (Hz). Most of the sounds which we hear in the environment do not consist of a single frequency, but of a broad band of frequencies, differing in level. The quantitative expression of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Fortunately, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively and severely deemphasizes the importance of frequency components below 1000 Hz, with mild deemphasis above 5000 Hz. This type of frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency midrange.

The weighting curve described above is called "A" weighting, and the level so measured is called the "A-weighted sound level," or simply "A-level."

The A-level in decibels is expressed "dBA"; the appended letter "A" is a reminder of the particular kind of weighting used for the measurement. In practice, the A-level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. All U.S. and international standard sound level meters include such a filter. Typical A-levels measured in the environment and in industry are shown in Figure 1.

Although the A-level may adequately describe environmental noise at any instant in time, the fact is that the community noise level varies continuously. Most environmental noise includes a conglomeration of distant noise souces which create a relatively steady background noise in which no particular source is identifiable. These distant sources may

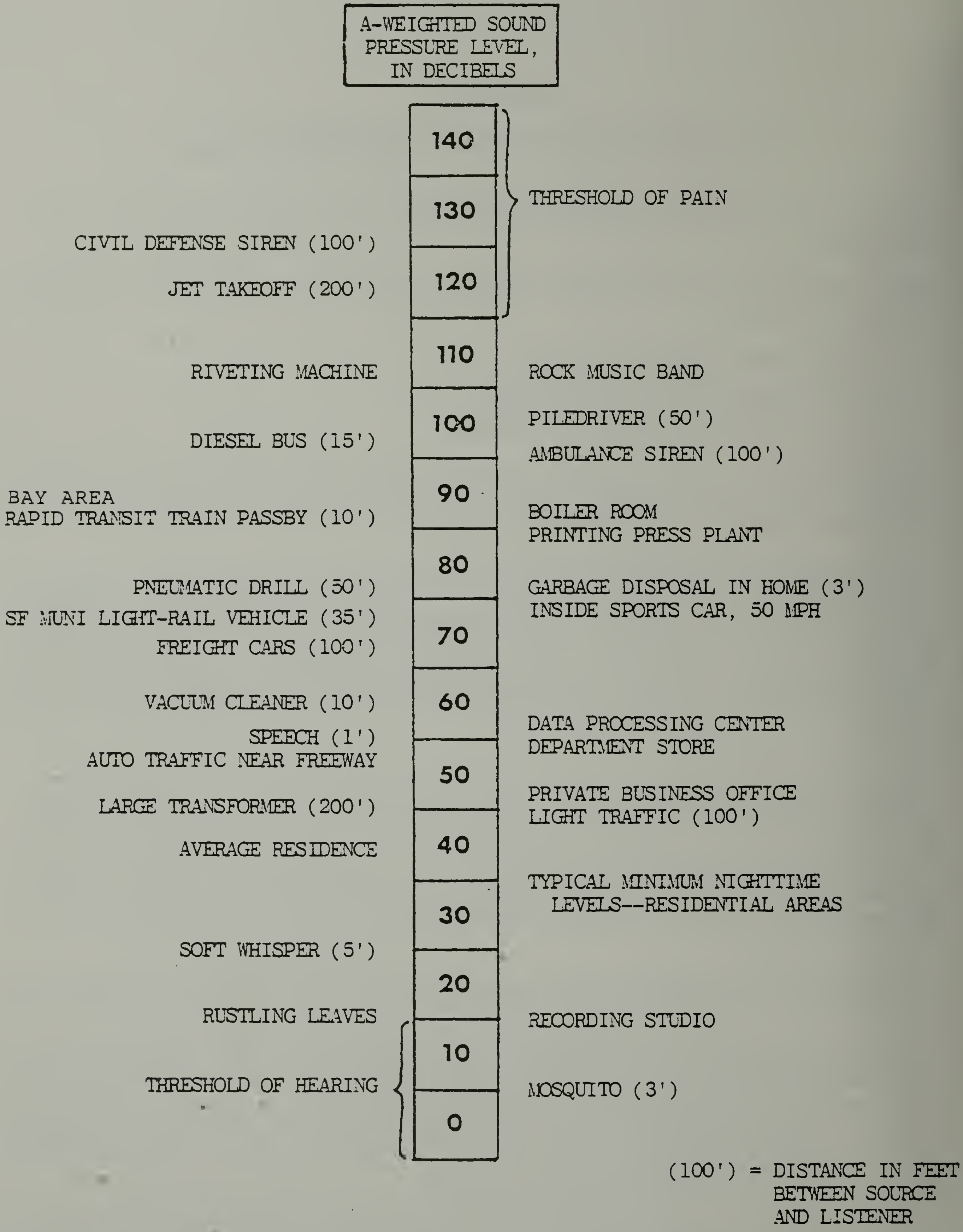


FIGURE 1: TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

include traffic, wind in trees, industrial activities, etc. These noise sources are relatively constant from moment to moment, but vary slowly from hour to hour as natural forces change or as human activity follows its daily cycle. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities or single vehicle passages, aircraft flyovers, etc., which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. The L10 is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the "average peak" noise. The L50 is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time period. The L50 represents the median sound level. The L90 is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period. The L90 is used to describe the background noise.

As it is often cumbersome to describe the noise environment with these statistical descriptors, a single number descriptor called the Leq is also widely used. The Leq is defined as the equivalent steady-state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period. The Leq is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noises become very noticeable. Further, most people are sleeping at night and are very sensitve to noise intrusion.

To account for human sensitivity to nighttime noise levels a descriptor, Ldn, (day-night equivalent sound level) was developed. The Ldn divides the 24-hour day into the daytime of 7 a.m. to 10 p.m. and the nighttime of 10 p.m. to 7 a.m. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Ldn, then, is the A-weighted average sound level in decibels during a 24-hour period with 10 dBA added to the hourly Leqs during the nighttime. For highway noise environments the Leq during the peak traffic hour is approximately equal to the Ldn.

The effects of noise on people can be listed in three general categories:

1. subjective effects of annoyance, nuisance, dissatisfaction
2. interference with activities such as speech, sleep, learning
3. physiological effects such as startle, hearing loss

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Unfortunately, there is as yet no completely satisfactory measure of the subject effects of noise, or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance, and habituation to noise over differing individual past experiences with noise.

Thus, an important parameter in determining a person's subjective reaction to a new noise is the existing noise environment to which one has adapted: the so-called "ambient" noise. "Ambient" is defined as "the all-encompassing noise associated with a given environment, being a composite of sounds from many sources, near and far." In general, the more a new noise exceeds the previously existing ambient, the less acceptable the new noise will be judged by the hearers.

With regard to increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

1. Except in carefully controlled laboratory experiments, a change of only 1 dBA cannot be perceived.

2. Outside of the laboratory, a 3-dBA change is considered a just-noticeable difference.

3. A change in level of at least 5 dBA is required before any noticeable change in community response would be expected.

4. A 10-dBA change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse change in community response.

Source : Charles M. Salter Associates, Inc., December 1982.

TABLE 1: NOISE MEASUREMENT DATA

Site No.	Location	Day and Time of Measurement	L_1*	L_{10}	L_{50}	L_{90}	L_{eq}**	Comments
A	15 ft. south of Jefferson St. in parking lot between Taylor and Jones	Tuesday 1/4/83 2:10 - 2:25 pm	73	67	62	59	64	Car traffic on Jefferson; buses to 80 dBA
A	" "	Wed. 1/5/83 1:45 - 2:00 pm	73	67	62	58	64	" "
B	15 feet north of Beach St.; 100 feet west of Taylor St.	Tuesday 1/4/83 2:30 - 2:45 pm	78	71	66	62	68	Opposite bus terminal, idling 66 dBA; car traffic; buses to 84 dBA
B	15 ft. north of Beach St.; 100 feet east of Jones St.	Thurs. 1/6/83 2:40 - 2:55 pm	74	69	62	59	65	Trucks to 80 dBA; buses to 76 dBA
C	Justin Herman Plaza, 50 ft. west of Embarcadero next to statue of Carlos III (same as site 7)	Tuesday 1/4/83 3:20 - 3:35 pm	77	74	70	69	72	Heavy traffic, cars and trucks on The Embarcadero; trucks to 84 dBA, ambient controlled by Embarcadero Freeway
C	" "	Wed. 1/5/83 2:35 - 2:50 pm	80	75	72	69	73	" "
D	80 ft. west of Embarcadero; 25 ft. west of railroad track; 80 ft. northeast of First St.	Tuesday 1/4/83 4:00 - 4:15 pm	73	69	64	62	66	Heavy truck traffic on The Embarcadero
D	" "	Wed. 1/5/83 3:00 - 3:15 pm	73	68	64	62	66	" "

*The sound level in dBA that was equaled or exceeded one percent of the time; L_{10}, L_{50}, L_{90} and L_{99} are the levels equaled or exceeded 10, 50, 90 and 99 percent of the time, respectively.
**The L_{eq} is the equivalent steady-state sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same time period.

Note: Refer to Figure IV.26 for location of noise measurement sites.

Table 1 ... continued

Site No.	Location	Day and Time of Measurement	L_1*	L_{10}	L_{50}	L_{90}	L_{eq}**	Comments
E	15 ft. south of King St.; 100 ft. east of Third St. in parking lot	Tuesday 1/4/83 4:20 - 4:35 pm	74	67	62	59	65	Light traffic on King, buses to 79 dBA; heavy traffic on Third
E	" "	Wed. 1/5/83 3:30 - 3:35 pm	69	65	60	57	62	" "
F	15 ft. east of Fourth St. between Channel and Third in parking lot	Tuesday 1/4/83 5:00 - 5:15 pm	80	73	66	59	70	Fast-moving traffic on Fourth; trucks and buses to 88 dBA
F	" "	Wed. 1/5/83 4:00 - 4:15 pm	81	75	64	56	71	" "
G	Aquatic Park, center of grassy area	Thurs. 3/10/83 12:15 - 12:30 pm	69	60	58	53	59	Surf noise dominant; aircraft overlight--72 dBA
H	Aquatic Park next to tracks in front of Maritime Musuem	Thurs. 3/10/83 11:45 - noon	70	67	64	56	63	Surf noise; distant traffic; two helicopters--58 dBA

TABLE 2: NOISE MEASUREMENT DATA

Site No.	Location	Day and Time of Measurement	L_1*	L_{10}	L_{50}	L_{90}	L_{eq}**	Comments
1	Beach and Grant, southeast corner	Monday 1/5/81 2:25- 2:40 pm	81	74	68	64	71	Beach St. traffic controls ambient; buses to 86 dBA
2	35 ft. west of Sansome; 125 ft. south of Lombard	Wed. 8/10/77 8:17- 8:32 am	73	68	62	55	65	Sansome St. traffic; many buses
2	" "	Wed. 8/10/77 5:11- 5:26 pm	76	72	66	60	68	" "
2	" "	Thurs. 8/11/77 6:00- 6:15 am	73	67	57	50	64	" "
3	100 ft. west of Embarcadero 90 ft. north of Filbert	Wed. 8/10/77 7:43- 7:58 am	70	67	63	57	64	Traffic on The Embarcadero and Battery; buses
3	" "	Wed. 8/10/77 4:20- 4:35 pm	70	64	60	57	62	" "
3	" "	Thurs. 8/11/77 6:45- 7:00 am	73	66	60	55	63	Traffic on The Embarcadero and Battery; buses, air-craft; train on Belt Line
4a	Golden Gateway condominiums, Drumm St. facing Embarcadero outside third floor	Thurs. 7/17/80 5:08- 5:13 pm	79	70	67	65	69	Traffic on Embarcadero Freeway and surface street
4b	Inside unit third floor vacant, carpet	Thurs. 7/17/80 5:08- 5:13 pm	50	43	39	38	41	" "

*The sound level in dBA that was equaled or exceeded one percent of the time; L_{10}, L_{50}, L_{90} and L_{eq} are the levels equaled or exceeded 10, 50, 90 and 99 percent of the time, respectively.
**The L_{eq} is the equivalent steady-state sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same time period.

charles m. salter associates, inc. 350 Pacific Avenue, San Francisco, CA. 94111 tel: (415) 397-0442

TABLE 2 ... continued

Site No.	Location	Day ant Time of Measurement	L_1*	L_{10}	L_{50}	L_{90}	L_{eq}**	Comments
5	60 ft. north of Market St.; 25 ft. north of the end of California St. cable car route	Monday 9/11/78 4:00- 4:10 pm	--	73	69	67	71	Traffic on Drumm and Market; buses to 78 dBA; cable car to 81 dBA
6	Justin Herman Plaza 40 ft. northeast of Market St. end	Tues. 9/12/78 10:08-10:18 am	--	70	65	63	67	Traffic on Embarcadero Freeway and surface street
7	Justin Herman Plaza 50 ft. west of Embarcadero next to statue of Carlos III	Tues. 9/12/78 10:55-11:05 am	--	73	69	65	70	" "
8	Justin Herman Plaza 60 ft. east of Steuart St. opposite south edge of Market	Tues. 9/12/78 10:40-10:50 am	--	68	66	64	66	" "
9	30 ft. east of Spear St. 240 ft. south of Market St.	Monday 9/11/78 4:35- 4:45 pm	--	67	64	63	65	Construction controls L_{90}
10	East Bay Terminal First and Natoma, 10 ft. from building facade, 18 ft. from curb under overpass	Wed. 8/9/78 12:05-12:20 pm	87	78	71	66	76	Traffic on First; trucks and buses to 88 dBA; motorcycle 96 dBA
10	" "	Thurs. 8/10/78 7:50- 8:05 am	88	83	76	69	79	Traffic on First; trucks and buses to 86 dBA; motorcycle 89 dBA
11	East Bay Terminal, Fremont and Natoma 12 ft. from curb	Wed. 8/9/78 12:40-12:50 pm	--	74	72	71	73	Traffic on Fremont; trucks and buses to 82 dBA; bus idling 71 dBA
11	" "	Wed. 8/9/78 12:50- 1:05 pm	81	73	66	61	71	Trucks and buses to 82 dBA
11	" "	Thurs. 8/10/78 8:10- 8:25 am	80	74	69	65	71	" "

TABLE 2 ... continued

Site No.	Location	Day and Time of Measurement	L_1*	L_{10}	L_{50}	L_{90}	L_{eq}**	Comments
12	10 ft. east of curb on Main St.; 150 ft. north of Howard St.	Monday 10/20/80 4:15- 4:30 pm	72	69	64	62	66	Main St. ramp traffic; Howard St. traffic
12	" "	Tues. 10/21/80 9:10- 9:25 am	77	71	66	63	68	" "
13	40 ft. west of Spear St. opposite loading docks at Rincon Annex	Monday 10/20/80 4:49- 5:04 pm	70	67	64	62	65	Spear St. traffic
13	" "	Tues. 10/21/80 8:45- 9:00 am	72	70	69	66	67	Spear St. and Embarcadero Freeway traffic
14	Bryant St. at south curb between First St. and Beale St.	Monday 3/29/82 1:07- 1:12 pm	--	--	--	--	68	Traffic on Highway 80
15	First St. between Bryant and Brannan	Monday 3/29/82 1:29- 1:34 pm	--	--	--	--	63	Bay Bridge traffic
16	Beale St. at west curb between Bryant and Brannan	Monday 3/29/82 1:37- 1:42 pm	--	--	--	--	70	Local and traffic on The Embarcadero; trucks to 75 dBA
17	Brannan St. between First St. and Beale St.	Monday 3/29/82 1:20- 1:25 pm	--	--	--	--	66	Brannan St. traffic; trucks to 74 dBA; shipyard

charles m. salter associates, inc. 350 Pacific Avenue, San Francisco, CA. 94111 tel: (415) 397-0442

TABLE 3: 24 HOUR ENVIRONMENTAL NOISE DATA

Site: 18

Location: North side of Columbus Avenue between North Point Street and Bay Street 50 feet above street, 8 feet from building

Date: Wednesday-Thursday June 16-17, 1982

Time	Leq (dBA)	
11 am	66	
12 noon	67	
1 pm	68	
2 pm	67	
3 pm	68	
4 pm	69	
5 pm	69	
6 pm	69	
7 pm	67	
8 pm	64	
9 pm	73	Siren: 90 dBA
10 pm	64	
11 pm	62	
12 midnight	62	
1 am	57	
2 am	57	
3 am	52	
4 am	53	
5 am	62	
6 am	66	
7 am	69	
8 am	71	
9 am	69	
10 am	69	

Ldn = 70 dBA

Noise environment is dominated by buses

TABLE 4: 24 HOUR ENVIRONMENTAL NOISE DATA

Site: 19

Location: 12 feet south of curb on Broadway,
75 feet east of Front Street,
15 feet above grade

Date: Tuesday- Wednesday, December 9-10, 1980

Time	Leq (dBA)	
11:15 - 12 noon	66	
12 noon	65	
1 pm	65	
2 pm	64	
3 pm	66	
4 pm	67	
5 pm	65	
6 pm	64	
7 pm	61	
8 pm	62	
9 pm	60	
10 pm	62	
11 pm	59	
12 midnight	59	
1 am	57	
2 am	55	
3 am	65	Idling auto or dumpster
4 am	56	
5 am	60	
6 am	63	
7 am	68	
8 am	66	
9 am	66	
10:00 - 11:15 am	66	

Ldn = 68 dBA

Noise environment is dominated by traffic

TABLE 5: 24 HOUR ENVIRONMENTAL NOISE DATA

Site: 20

Location: North side Pacific Avenue, 120 feet west of Embarcadero Freeway on power pole 15 feet above grade

Date: Monday - Tuesday, March 27-28, 1978

Time	Leq (dBA)
11:10 - 12 noon	68
12 noon	68
1 pm	68
2 pm	68
3 pm	69
4 pm	68
5 pm	68
6 pm	67
7 pm	64
8 pm	64
9 pm	63
10 pm	62
11 pm	62
12 midnight	60
1 am	59
2 am	61
3 am	57
4 am	58
5 am	62
6 am	70
7 am	68
8 am	71
9 am	71
10 am	68
11:00 - 11:10 am	71

Ldn = 71 dBA

Noise environment is dominated by traffic

APPENDIX E

Background Traffic and Transportation Data

Table E-1

PM PEAK PERIOD TRANSIT TRAVEL TIMES
Door-to-Door Time in Minutes

Origin	Destination	Existing Travel Times	Year 2000 Travel Times: I	II	III	IV	IV-A	V	V-A	VI
Trips within Study Corridor (Internal Trips)										
Embarcadero	Fisherman's Wharf	21	20	19	18	18	18	18	18	18
	SP Depot Area	24	25	21	19	19	19	20	20	19
Financial District	Fisherman's Wharf	21	22	22	21	21	21	21	21	22
	SP Dépot Area	22	23	23	16	16	16	16	16	24
Transbay Terminal Area	Fisherman's Wharf	24	25	25	19	19	20	19	19	19
	SP Depot Area	18	19	18	18	18	18	18	18	20
Fishermans' Wharf	SP Depot Area	27	26	25	22	22	22	26	26	22
Study Area to Other Areas (External Trips)										
Embarcadero	Civic Center	21	21	21	21	20	20	21	21	21
	San Francisco State	48	48	47	47	43	44	47	47	47
	Hunter's Point	39	41	42	49	49	46	46	45	42
	San Mateo	68	69	65	63	63	63	56	57	56
Financial District	Civic Center	20	21	21	22	22	21	21	21	21
	San Francisco State	44	44	43	43	40	40	43	43	43
	Hunter's Point	29	30	31	36	36	34	35	34	32
	San Mateo	66	67	68	60	60	60	56	53	56
Transbay Terminal Area	Civic Center	23	24	24	20	21	21	20	20	20
	San Francisco State	46	46	45	45	42	42	45	45	45
	Hunter's Point	28	29	30	37	37	33	33	32	30
	San Mateo (PCS)	62	63	62	62	62	62	52	50	52
	San Mateo (SamTrans)	65	62	59	63	67	66	57	57	57
Fisherman's Wharf	San Francisco State	62	62	59	56	51	52	53	53	53
	Hunter's Point	47	49	50	58	58	54	54	53	50
	Oakland	56	58	58	50	50	51	50	50	50
	Walnut Creek	69	69	67	66	62	63	62	62	62
	San Mateo	71	70	69	66	66	66	64	65	64
SP Depot Area	Civic Center	28	31	28	23	23	23	23	23	29
	San Francisco State	54	57	53	50	48	48	50	50	54
	Oakland	48	50	50	51	51	51	51	51	51
	Walnut Creek	69	68	65	60	60	60	60	60	66
Trips Passing Through Study Corridor (Through Trips)										
Civic Center	Oakland	52	53	53	49	52	51	51	51	51
	San Mateo	74	77	75	67	67	67	61	64	66
San Francisco State	Oakland	80	80	79	79	76	76	79	79	79
	Walnut Creek	86	86	85	85	84	84	85	85	85
Hunter's Point	Oakland	68	68	68	69	69	69	70	69	70
	Walnut Creek	81	81	81	82	82	82	83	82	83
San Mateo	Oakland	95	91	91	91	91	91	89	89	89
	Walnut Creek	118	117	115	109	109	109	108	105	108

Notes: Trips with equal travel times across all alternatives omitted from table.

Transit travel time includes access, wait, in-vehicle, transfer and egress times via bus or rail routes deemed most convenient for the trips; actual travel time via alternative routes may be less than shown.

1983).

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IVA and VA (August 1983).

Table E-2

SUMMARY OF PROJECTED DAILY PATRONAGE
Year 2000 Daily Trips - Baseline Projection[1]

		Year 2000 Daily Trips							
	Existing	I	II	III	IV	IV-A	V	V-A	VI
32/E-Line[2]									
1. Existing Population	1,800	1,800	2,000	2,100	2,100	2,200	2,100	2,100	2,100
2. Future Population -									
Employment	-	1,300	1,400	1,100	1,100	1,100	1,100	1,100	1,600
Residential	-	1,500	1,700	100	100	100	100	100	2,500
3. Recreational Trips	-	-	3,000[3]	5,700	6,100	6,200	6,100	6,100	6,100
4. Mission Bay Access	-	900	1,000	400	400	400	-	-	1,600
5. SP Depot Access	800	1,900	2,000	800	800	800	600	600	600
6. Intercept Parking Access	-	-	300	100	100	100	-	-	200
Total E-Line	2,600	7,400	11,400	10,300	10,700	10,900	10,000	10,000	14,700
MUNI-Metro Extension									
1. Future Population									
Employment	-	-	-	1,400	1,400	1,400	1,400	1,400	-
Residential	-	-	-	2,800	2,800	2,800	2,800	2,800	-
2. Mission Bay Access	-	-	-	7,800	7,800	7,800	8,200	8,200	-
3. SP Depot Access	-	-	-	9,100	9,100	9,100	2,600	2,600	-
4. Intercept Parking Access	-	-	-	600	600	600	500	500	-
Total MMX				21,700	21,700	21,700	15,500	15,500	
PCS/PCS Extension									
Total PCS	13,200	19,100	19,200	23,000	23,000	23,000	28,800	29,700	28,100
Linked Transit Trips									
Total E, MMX, PCS	15,000	24,600	28,600	45,100	45,500	45,700	51,100	52,000	42,200

---

1 Ridership projections depend highly on downtown growth projections and other factors as described in Final Working Paper 1.5.6. Lower and upper bounds for Alternative IV linked trips, for example, are 70-150 percent of the baseline (see Final Working Paper 1.5.6, Table III-23). Numbers shown should therefore be used for comparative purposes only.

2 Includes F-Line users along The Embarcadero.

3 Assumes use of vintage-era double-decker buses on the route.

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IV-A and V-A (August 1983).

Table E-3

TRANSIT CAPACITIES AND LOAD FACTORS
Year 2000 Peak Hour

	I	II	III	IV	IV-A	V	V-A	VI
A. 32/E-Line North of Market								
Capacity per vehicle[1]	70	70[2]	100	100	100	100	100	100
Vehicles Per hour	7.5	7.5	8	8	8	8	8	8
Total Capacity (one-way)	525	525	800	800	800	800	800	800
Peak Load	640	760	1,020	1,040	1,060	880	880	900
Percent Capacity Used	122%	145%	128%	130%	132%	110%	110%	113%
B. 32/E-Line South of Market								
Capacity per vehicle*	70	70[2]	100	100	100	-	-	100
Vehicles Per hour	7.5	15	8	8	8	-	-	8
Total Capacity (one-way)	525	1,050	800	800	800	-	-	800
Peak Load	800	900	310	310	310	-	-	660
Percent Capacity Used	152%	86%	39%	39%	39%	-	-	83%
C. MMX Embarcadero South of Market								
Capacity per vehicle[1]	-	-	300[3]	300[3]	300[3]	300[3]	300[3]	-
Vehicles Per hour	-	-	15	15	15	15	15	-
Total Capacity (one-way)	-	-	4,500	4,500	4,500	4,500	4,500	-
Peak Load	-	-	3,470	3,470	3,470	1,390	1,390	-
Percent Capacity Used	-	-	77%	77%	77%	31%	31%	-
D. PCSX Line South of Townsend								
Line Capacity (two hours)[4]	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200
Peak Load (two hours)	7,800	7,800	9,400	9,400	9,400	11,750	12,100	11,400
Percent Capacity Used	95%	95%	115%	115%	115%	143%	148%	139%

---

1 Capacities include standees.

2 Assumes vintage-era double-decker buses (56 seats plus standees).

3 Assumes two-car trains.

4 Programmed 86-87 capacity. Two-Hour period shown for consistency with underlying corridor projections developed in Final Working Paper 1.5.6. It is anticipated that capacity would be increased by year 2000 to meet projected demand; therefore load factors are for comparative purposes only.

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IV-A and V-A (August 1983).

Table E-4

MAJOR SURFACE TRANSIT VEHICLE DELAYS RELATIVE TO EXISTING[1]

Year 2000 PM Peak Period

Route(s)	Direction	Buses Per Hour	Minutes of Delay Relative to Existing: I	II	III	IV	IV-A	V	V-A	VI
2	Westbound	4	0	0	6	6	1	1	1	1
	Eastbound	4	0	0	6	6	1	1	1	1
Market to Transbay (5,6,38,38L)	Westbound	48	1	1	3	3	1	1	1	1
	Eastbound	48	1	2	2	1	1	1	1	1
Market to Ferry Building (7,8,21,31)	Westbound	30	1	1	6	6	2	2	2	2
	Eastbound	30	1	1	6	6	2	2	2	2
Mission Street (9,11,12,14,14L)	Westbound	31	1	1	6	5	2	2	1	2
	Eastbound	23	2	2	7	6	4	3	2	3
14X	Westbound	12	2	2	4	3	2	2	1	1
15	Southbound	10	2	2	10	10	7	6	6	4
	Northbound	10	3	3	5	5	3	3	3	3
17X	Southbound	5	4	1	8	8	4	5	5	2
25	Southbound	7	2	0	2	2	2	2	2	1
	Northbound	7	2	1	3	2	1	1	1	2
27	Southbound	4	6	2	8	8	6	7	7	4
	Northbound	4	4	3	9	9	7	9	7	4
30	Northbound	20	1	1	3	3	1	1	1	1
	Southbound	20	1	0	5	5	3	3	3	2
30 AX,BX	Southbound	12	3	2	6	6	4	5	5	1
41	Northbound	12	1	0	12	12	3	4	4	4
	Southbound	12	2	2	6	6	2	3	3	3
42	Northbound	5	5	4	16	16	9	11	9	5
	Southbound	5	5	3	11	11	8	8	8	6
81X	Northbound	12	2	2	4	4	2	-	-	-
	Southbound	12	1	0	4	4	2	-	-	-

1 Only includes routes with delays of more than 2 minutes in one or more alternatives. Assumes no rerouting or other mitigation measures to avoid trip delays.

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IV-A and V-A (August 1983).

Table E-5

COMPARISON OF IMPACTS ON MUNI-METRO SYSTEM OPERATION

	Existing, I	II	III	IV, IV-A	V, V-A	VI
System Capacity[1]						
Max. Trains per hour	30	40	26	48	26	40
Percent Ultimate Subway Capacity	50%	67%	43%	80%	43%	67%
Ability to Meet Projected Long-Range Demand	No	Yes-with Coupling (but very tight)	No	Yes-with partial coupling	No	Yes-with Coupling (but very tight)
Ranking[2]	3	2	4	1	4	2
Quality of Service						
Normal Passenger Delays	2-6 Min.	2-6 Min.	2-6 Min.	None	2-6 Min.	2-6 Min.
Probability of Service Interruptions[3]	38%	34%	38%	14%	38%	34%
Ranking[2]	3	2	3	1	3	2
System Flexibility						
Storage Capacity at Foot of Market:						
(i) Total Cars	4	4	4	4	4	4
(ii) Max. Cars/Train	2	4	4	4	4	4
Temporary Layover to Recover Schedules/Reverse Trains	No	Yes	Yes	Yes	Yes	Yes
Storage Capacity at SP Depot Total Cars:	-	-	4	4	4	-
Ranking[2]	3	2	1	1	1	2

1 Internal working memorandum: Impacts of Embarcadero Turnaround on Muni-Metro Operations, I-180 Transfer Concept Program, July, 1983.

2 Qualitative ranking: 1=Best, 6=Worst.

3 Source: "Design Report for a Track Extension and Turnaround," Sverdrup/Foster, September, 1978.

Source: Final Working Paper 2.2.2 (July1983) and Supplement for Alternatives IVA VA (August 1983).

Table E-6

PM PEAK PERIOD HIGHWAY TRAVEL TIMES
Door-to-Door Times in Minutes

Origin	Destination	Existing Travel Times	Year 2000 Travel Times I	II	III	IV	IV-A	V	V-A	VI
Trips within Study Corridor (Internal)										
Embarcadero	Fisherman's Wharf	14	15	16	15	15	15	15	15	16
	SP Depot Area	14	18	17	20	20	21	21	20	18
Financial District	Fisherman's Wharf	16	17	18	18	18	18	18	18	18
	SP Depot Area	14	16	15	21	22	19	19	18	16
Transbay Terminal Area	Fisherman's Wharf	17	18	18	26	26	23	23	24	18
	SP Depot Area	10	11	10	18	18	12	14	13	14
Fisherman's Wharf	SP Depot Area	17	17	19	26	25	26	26	25	23
Study Area to Other Areas (External)										
Embarcadero	Civic Center	18	19	19	20	20	19	19	19	19
	San Francisco State	31	32	32	37	37	35	35	35	32
	Hunter's Point	22	23	23	26	29	26	26	26	23
	Oakland	34	35	35	41	41	39	39	39	35
	Walnut Creek	51	52	52	57	57	56	56	56	52
	San Mateo	46	47	47	52	52	50	50	50	47
Financial District	Civic Center	17	17	17	18	18	17	17	17	17
	San Francisco State	33	34	34	36	36	35	35	35	34
	Hunter's Point	24	25	25	27	27	26	26	26	25
	Oakland	36	37	37	39	39	40	37	40	40
	Walnut Creek	53	54	54	56	57	57	57	57	54
	San Mateo	47	48	48	50	50	49	49	49	48
Transbay Terminal Area	Civic Center	16	18	18	19	18	18	18	18	17
	San Francisco State	29	33	32	38	38	37	36	37	34
	Hunter's Point	20	23	20	22	22	22	21	22	20
	Oakland	31	33	33	34	34	35	35	35	33
	Walnut Creek	48	50	50	51	51	52	52	52	50
	San Mateo	44	48	48	52	52	51	51	52	49
Fisherman's Wharf	San Francisco State	38	39	40	41	41	40	40	40	40
	Hunter's Point	29	31	32	33	35	32	32	32	32
	Oakland	40	41	42	49	48	44	44	44	42
	Walnut Creek	56	58	59	66	65	61	61	61	59
	San Mateo	52	54	55	56	56	55	55	55	55
SP Depot Area	San Francisco State	25	28	24	25	24	24	27	27	27
	Oakland	29	30	29	31	31	31	31	31	29
	Walnut Creek	45	47	46	48	48	48	48	48	46
	San Mateo	39	43	39	39	38	38	41	41	41
Trips Passing Through Study Corridor (Through)										
Civic Center	Oakland	33	33	33	34	34	33	33	33	33
	Walnut Creek	50	50	50	51	51	50	50	50	50
Hunter's Point	Oakland	34	36	35	39	39	39	37	37	35
	Walnut Creek	51	53	52	56	56	56	54	54	52

Note: Trips with equal travel times across all alternatives omitted from table.

Source: Final Working Paper 2.2.2 (July 1983) and Supplement for Alternatives IV-A and V-A (August 1983).

APPENDIX F

Description of Historic Resources and Historic and Pre-Historic Archaeological Setting

APPENDIX F

DESCRIPTION OF HISTORIC RESOURCES AND HISTORIC AND PRE-HISTORIC ARCHAEOLOGICAL SETTING

1. Description of Historic Resources

Twenty-nine historic resources were identified within the area of potential environmental impact of the alternatives under consideration. These resources are described below beginning with those in the China Basin segment and proceeding north along the project area to Fort Mason. Numbers in parentheses refer to the inventory of historic resources presented in Figure F-1. The National Register status of each resource and, where applicable, its rating by the Foundation for San Francisco's Architectural Heritage (Heritage) is given.[1]

Potential Rincon Point/South Beach Historic Warehouse-Industrial District (11). Development of the Rincon Point/South Beach area began in the 1850s and 1860s as a result of expanded sea trade in San Francisco created by the Gold Rush. The area was developed to serve the warehousing needs of a growing port. Early facilities included the Pacific Mail Steam Ship Company, which developed warehouses, shops and wharves. Of these, the company's Oriental Warehouse still stands. Further development of warehouses, dry docks, shipyards and other industries in this area continued following seawall construction between 1878 and 1924. Although many of the older warehouses have been destroyed, those that remain afford a picture of the area's general appearance during this important period. In the early 1900s, following the 1906 earthquake and fire, the Rincon Point/South Beach area became mixed in nature, with apartments and hotels appearing among businesses, light industry and more traditional warehouses. Today this potential Historic District contains 60 buildings which Caltrans has designated as contributing to the significance of the area (see Figure F-2). The potential Rincon Point/South Beach Historic Warehouse-Industrial District is significant in the areas of history and architecture and appears to meet National Register criteria A, B, C and D.[2]

Castle Brothers Warehouse (1), 128 King Street. This three-story brick structure was built in 1912 to store dried fruits and it still functions as a warehouse. The building's light

1 Castle Brothers Warehouse (DE)
2 Southern Pacific Warehouse (DE)
3 Shipwreck of the <u>Lydia</u> (NR)
4 Rincon Annex (NR/SFL)
5 Oriental Warehouse (NR, pending SFL)
6 Y.M.C.A. (DE)
7 Audiffred Building (NR/SFL)
8 Agricultural Building Ferry Station Post Office (NR)
9 Ferry Building, Union Ferry Depot (NR/SFL)
10 Seawall (DE, not mapped)
11 Potential Rincon Point/South Beach Historic Warehouse-Industrial District (PE)
12 San Francisco Municipal Railway Cable Cars (NHL/NR)
13 Aquatic Park (NRHD, proposed)
14 Fire Department Pumping Station #2 (NR)
15 Fort Mason (NR)
16 Hathaways Warehouse (PE)
17 Folger's Coffee (PE)
18 Seaman's Institute (PE)
19 Embarcadero Inn (PE)
20 Martin Bldg. (PE)
21 Mercedes Oil Bldg. (PE)
22 Marine Electric Com. (PE)
23 California Boiler Works (PE)
24 Southern Pacific Bldg. (PE)
25 Italian American Hotel (PE)
26 Piers and Bulkheads, 1, 3 & 5 (PE)
27 San Francisco/Oakland Bay Bridge (PE)
28 Transbay Transit Terminal (PE)
— Belt Line Railway (PE)

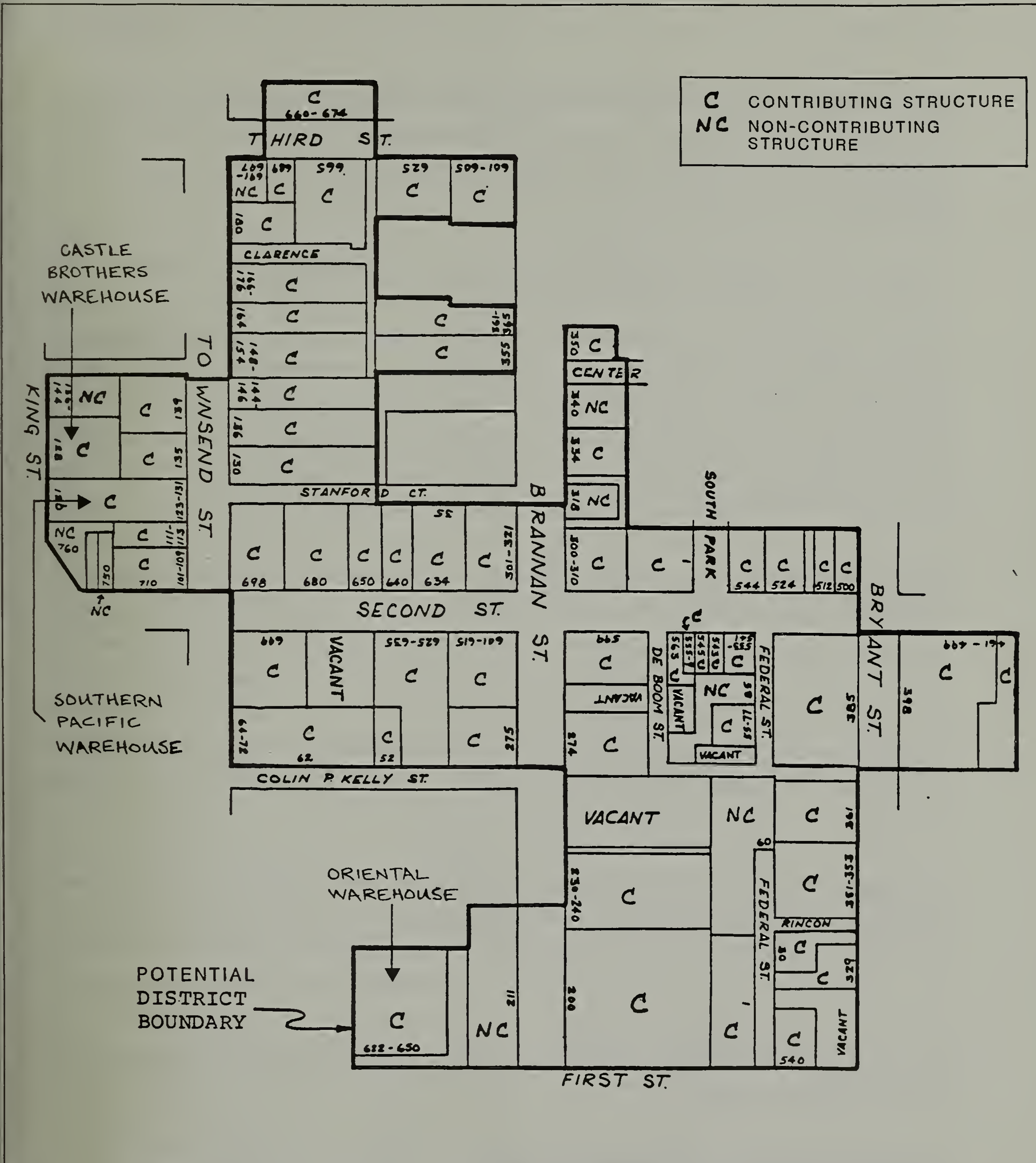
HISTORIC RESOURCES

SCALE 0 800 1600 2400 FEET

NHL: National Historic Landmark
NR: Listed on National Register
DE: Determined Eligible for National Register
NOTE: Figure only shows remaining portion of original Belt Line track alignment.

NRHD: National Register Historic District
SFL: City and County of San Francisco Landmark (Designated under Article 10 of Planning Code)
PE: Potentially eligible for National Register

F-1



POTENTIAL RINCON POINT-SOUTH BEACH HISTORIC INDUSTRIAL/ WAREHOUSE DISTRICT

NOT TO SCALE

F-2

ornamentation includes a corbelled angled loading dock originally designed for rail access. The Castle Brothers Warehouse is within the potential Rincon Point/South Beach Historic Warehouse-Industrial District and, in 1982, it was determined eligible for the National Register.

Southern Pacific Warehouse (2), 123 Townsend Street and 126 King Street. This six-story brick warehouse was built between 1902 and 1904 by the Haslett Warehouse Company for its prime tenant, the Southern Pacific Company. The warehouse remains one of the most prominent buildings in the South Beach area and its facade still bears the faded sign "The Haslett Warehouses." The Townsend and King Street facades are distinguished by arched fenestrations and a curved, detailed brick cornice. The Southern Pacific Warehouse is within the potential Rincon Point/South Beach Warehouse-Industrial Historic District and it was determined eligible for the National Register in 1982.

Oriental Warehouse (5), First and Brannon. The 38-foot high Oriental Warehouse represents a simplified use of brick with less architectural sophistication than is sometimes found in later warehouses. Built in 1867 for the Pacific Mail Steamship Company, this building served as the center of the San Francisco Trans-Pacific trade in rice, silk, tea and coffee. Though its dock no longer exists, the building still functions as a warehouse and its painted sign is one of the oldest in the City. The Oriental Warehouse was determined eligible for the National Register in 1981; it was designated a City and County of San Francisco Landmark in 1977.

Shipwreck of the Lydia (3), King and The Embarcadero. The buried remains of the Lydia, a whaler built in 1840, are important for their information potential. Parts of the Lydia's hull were recovered during sewer construction in 1978.[3] The remains are located about five and one-half feet below the intersection of King Street and the Embarcadero roadway. The stern section is a locally rare surviving example of an intact keel-to-deck portion of a large American merchant ship of the period. The Lydia was listed on the National Register in 1981.

Hathaway's Warehouse (16), 101 Harrison Street. This is a two-story brick structure which was constructed between 1856 and 1890. The warehouse features a variety of decorative brick detailing. Facades are divided into a series of bays by brick pilasters. A projecting belt course separates the building's two stories. Hathaway's Warehouse was originally

located directly on the waterfront. The integrity of the setting has changed as landfill shifted the shoreline and structures from later periods have been built around it. Although the building has undergone a number of physical changes, it still retains a high degree of integrity with regard to location, design, materials, workmanship, feeling and association. Hathaway's Warehouse is potentially eligible for the National Register under criteria A and C.

Seaman's Institute (18), 240-242 Steuart Street. This is a two-story reinforced concrete building which was designed by a noted architectural firm (Wright, Rushforth and Cahill) and constructed in 1907. The building's front facade features two towers flanking a slightly recessed central bay. Windows and entries are set in semi-circular arched openings. Facade modifications have altered the building's integrity of design; however, it remains a rare survivor of San Francisco's turn-of-the-century waterfront and its present use by Simpson and Fisher Sailmakers continues that association. While its modifications preclude this building from being significant for its architecture in its present condition, its associations with broad patterns of local history appear to meet National Register criterion A. This building has been rated "C" by Heritage, but this could be changed to a "B" if alterations were reversed.

Folger's Coffee (17), 101 Howard Street and 201 Spear Street. This five-story brick office building was constructed in 1904 for the Folger Coffee Company, one of San Francisco's oldest businesses. The building was designed by Henry A. Schulze and is a rare survivor of the 1906 earthquake and fire. The building features arched fenestration on the top and bottom floors, a detailed brick cornice and parapet above the top floor and wrought-iron balconies on the Howard Street facade. Alterations have been minor and the building possesses a high degree of integrity. It appears to meet National Register criteria B and C. Heritage has rated the building "A."

Y.M.C.A. (6), 166 The Embarcadero. This is an eight-story brick building designed by Carl Werner and built in 1925-26. The building's facade includes decorative detailing in the Renaissance Revival style. Inside, the building's first floor lobby has a Moorish quality, with vaulted ceilings and decorative tile wall panelling. It anchors the southern end of the historic group of buildings called the East Row, along the Embarcadero between Howard and Mission Streets. The entry wing of the building, facing the bay, features a handsome brick facade, arched windows, ornate balconies and decorative concrete crests. The

Embarcadero Freeway lies within ten feet of the building's southeast corner. The Y.M.C.A. building was determined eligible for the National Register in 1982 and was rated "A" by Heritage.

Embarcadero Inn (19), 144-146 The Embarcadero. This four-story brick building was built in 1906 when it was known as the Hotel Admiral. The Embarcadero facade is plastered with cement to imitate stone masonry construction. Its design includes arched windows with keystones, a central recessed entry with a semi-domed glass marquee and an entablature decorated with cartouches. The building was given a rating of "C" (which could change to a "B" if alterations are reversed) by Heritage which noted that it is the last functioning hotel of its period on the Embarcadero roadway. The building's integrity as an example of a type, period and method of construction and its continuing historic relationship with the waterfront appear to meet National Register criterion C.

Audiffred Building (7), 1-21 The Embarcadero. Built in 1889, the three-story Audiffred Building is one of a few remaining structures on the landward side of the Embarcadero roadway that survived the 1906 earthquake and fire. It features a mansard roof, decorative brickwork and unique cast iron ornaments on the exterior; the architect is unknown. It is the northern anchor building of the historic East Row between Howard and Mission Streets. The building was gutted by fire in 1978 and was just recently rehabilitated. The Audiffred Building was listed on the National Register in 1979 and was designated a City and County of San Francisco Landmark in 1968. The building has been rated "A" by Heritage.

Rincon Annex (4), Mission and Spear Streets. Designed by Gilbert Stanley Underwood and built in 1939-40, the Rincon Annex is an excellent example of Public Works Administration "moderne" style of architecture. The interior lobby features murals depicting scenes from San Francisco's history. Painted by Anton Refregier in 1947-48, the brilliantly colored panels were highly controversial when they were installed, due to disagreement over the choice of events that are depicted and on the basis of the artist's political views. Repeated compaigns have ensued ever since to have them removed. The building still functions as a post office. It was listed on the National Register in 1979 and was designated a City and County of San Francisco Landmark in 1980. The building has been rated "A" by Heritage.

Southern Pacific Building (24), 1 Market Street. This ten-story building was one of the earliest major corporate headquarter buildings in San Francisco. Designed by the architectural firm of Bliss and Faville and built in 1916, this structure is architecturally significant for its fine use of brick and terra cotta and for Renaissance/Baroque detailing such as ornately designed arches at the lower level, balconettes, stone spandrels and Corinthian half-columns beneath a cornice with classical details. The building is rich in architectural design and has long been a prominent visual landmark in San Francisco; it is potentially eligible for National Register criteria A, B and C. The building has been rated "A" by Heritage.

Agricultural Ferry Building Station Post Office (8), The Embarcadero at Mission Street. This building was constructed in 1914-15 as a U.S. Post Office but has been known as the Agriculture Building since it was transferred to the U.S. Department of Agriculture in the 1930s. Designed by A.A. Pyle of the State Department of Engineering, the building features a modified palazzo design with Renaissance ornamentation, generally Mediterranean in effect. It was listed on the National Register in 1978 and has been rated "A" by Heritage.

Ferry Building (9), The Embarcadero foot of Market Street. Constructed between 1894 and 1898, the Ferry Building served as the City's ferry terminal as well as housing state offices. It was one of the few downtown buildings to survive the 1906 earthquake and fire. It was designed by A. Page Brown, one of the City's most noted architects of the period. After ferry service ended in 1958, the building was remodeled and today it houses a number of uses, including the World Trade Center and the San Francisco Port Authority. It was designated a City and County of San Francisco Landmark in 1977 and was listed on the National Register in 1978. It has been rated "A" by Heritage. The building is presently the subject of a major planned adaptive reuse and restoration project for office and retail development.

San Francisco Municipal Railway Cable Cars (12). Invented in San Francisco in 1873 by Andrew S. Hallidie, the cable car spread across the country in the 1870s. Only three lines still run in San Francisco, and the system is presently shut down for rehabilitation. The San Francisco cable cars are a National Historic Landmark; they were listed on the National Register in 1966 and have been rated "A" by Heritage.

Martin Building (20), 527-529 Howard Street, and Mercedes Oil Company Building (21), 531-533 Howard Street. These buildings are a pair of twin designs built in 1906 by a prolific California architect, William H. Weeks. Both are four-story commercial buildings of brick masonry construction with massive sheet metal cornices and buff or off-white pressed brick facings. Decorative elements featured at the cornice level include decorative brick courses. Alterations are minimal and, with virtually intact architectural integrity, both buildings appear to meet National Register criteria B and C. Both buildings have been rated "C" by Heritage.

Marine Electric Company (22), 350-356 Howard Street. The Marine Electric Company building was designed by Emil John and constructed in 1907. The building represents a formal design approach to a smaller commission, featuring: a brick parapet around the top; brick pilasters which divide the Fremont Street facade into two bays and the Howard Street facade into seven bays; and iron pillars at the ground floor. The Marine Electric Company building appears to meet National Register criteria B and C at the local level but has not been rated by Heritage. This would be one of two buildings demolished in one of the alternatives, Figure F-3.

California Boiler Works (23), 522-528 Howard Street. Designed by Henry Geilfuss and Son, this building housed the California Boiler Works from the time it was constructed in 1910 to at least 1923. The one-story brick industrial building features a gable roof with semi-circular arched windows. The building retains a high degree of integrity, representing a type, period, method of construction and association with one of San Francisco's prominent 19th century immigrant architects whose work spanned the transition to the 20th century post-fire period. The California Boiler Works building appears to meet National Register criteria B and C and has been rated "B" by Heritage.

Piers and Bulkheads 1,3 and 5 (26). These bulkheads recall the years when the Port of San Francisco was the busiest on the West Coast. The Neoclassical style was one of three major architectural styles used for the pier bulkheads. While these bulkheads are the work of two different architects and represent three separate time periods spanning 13 years, they reflect the effort at unified design, while the style reflects economic strength and stability of the port. Many of the bulkheads have been destroyed; this row continues to dominate this stretch of the Embarcadero roadway, recalling the heyday of the Port of San Francisco. The bulkheads represent a type, period and method of construction which appear to meet National Register criterion C.

__Seawall (10).__ The seawall was originally designed by T.J. Arnold in 1872 for the State Board of Harbor Commissioners. Although various sections were built in subsequent years, the line of the seawall was designated in 1877, establishing the present eastern and northern boundaries of the City. With construction of the seawall, the area known as the Embarcadero was created. The Embarcadero extends from China Basin to Taylor Street. As the major transportation corridor for people, goods and services on the waterfront it makes the transition from the termination of the city grid to the curving waterfront. The seawall was determined eligible for the National Register in 1978.

__Italian American Hotel (25), 840 Sansome Street.__ This five-story brick hotel and restaurant presents a facade which is capped by a massive sheet-metal cornice with an ornate new-Baroque pediment. Tall narrow windows accentuate the height and narrow width of the building itself which also features an ornate wrought-iron fire escape. The architect and date of construction are unknown but the building remains architecturally significant and appears to meet National Register criterion C.

__Aquatic Park (13) and Fort Mason (15).__ The setting and significance of Aquatic Park, which was proposed for the National Register in 1981, and Fort Mason, listed on the National Register since 1979, are discussed in Section VI.D, Parkland Resources.

__Fire Department Pumping Station #2 (14), north end of Van Ness Avenue.__ This Mission Revival Style reinforced concrete building was designed by the Engineering Department of the City and County of San Francisco and constructed in 1912. Built in reaction to the earthquake and fire of 1906, the building houses equipment designed to pump salt water into the City's auxiliary water supply system to provide protection against another major fire. It remains operational today. This building was placed on the National Register in 1976.

__Belt Line Railway.__ The Belt Line was constructed beginning in 1889 to handle cargo to and from San Francisco's growing port and to serve numerous industries along the waterfront. The Belt Line was unusual then, as now, in that it was a publicly owned railway. The Belt Line and the Seawall were both instrumental to the development of the waterfront. The wide flat area known as The Embarcadero, which was created by the Seawall, was naturally suited for the Belt Line railway tracks, with room for access to both warehouses and wharves. By the 1930s the Belt Line included 70 miles of tracks.

During World War II, use of the railway peaked and trains were operating around the clock. Since the war, use of the Belt Line has declined with the shift to containerized cargos which have made the railway, and the piers themselves, obsolete. Today the Belt Line is still considered a well planned and well constructed railway, although its integrity has been reduced by the removal, paving over or deterioration of 40% of its original tracks. Figure F-1 shows only the remaining portions of the original Belt Line alignment. The Belt Line is potentially eligible for the National Register under criterion A.

San Francisco-Oakland Bay Bridge (27). Completed in 1936, this bridge across San Francisco Bay consists of two structures joined by a tunnel through Yerba Buena Island. The San Francisco side consists of two suspension sections joined by a massive center pier; the Oakland side combines two types of truss design with a long cantilever span of 1,400 feet. The bridge was originally constructed to carry six lanes of auto traffic on the upper deck and three lanes on the bottom deck for trucks and a double-track rapid transit line. After rail service was discontinued in 1958, the bridge was reconstructed to carry five lanes westbound above and five lanes eastbound below. Charles H. Purcell was the chief engineer; others connected with the project were Charles E. Andrews, bridge engineer; Glenn B. Woodruff, design engineer; T.L. Pfleuger, Arthur Brown, Jr., and John J. Donovan, consulting architects. The bridge appears to meet National Register criteria A, B and C.

Transbay Transit Terminal (28), 425 Mission Street. The Transbay Terminal features an 870-foot-long passenger platform and a 230-foot-long central pavilion. Its extremely simple design is almost without ornamentation; the front of the building features seven two-story windows. Originally designed as a terminal for trains that came across the San Francisco-Oakland Bay Bridge, the Transbay Terminal replaced the Ferry building as the primary gateway to the City when the Terminal was opened in 1939. The Transbay Terminal is not considered an integral element of the San Francisco-Oakland Bay Bridge as it was structurally linked to the Bridge only because of East Bay Rail Service and not for engineering reasons. In 1980, the SHPO determined that the terminal failed to meet National Register criteria. Heritage has rated the building "B."

2. Historic and Prehistoric Archaeological Resources

Five previously recorded pre-historic archaeological sites have been identified in the vicinity of the I-280 Transfer Concept Program Corridor. None is within the APEI. Three

are located in Fort Mason, one is near Harrison and Third Streets, and the other is near Hyde and Beach Streets. Most of the I-280 project Corridor was, in fact, open water or marshland in pre-historic times.

The primary archaeological significance of the study area involves historic archaeology. At the height of its power during the last quarter of the 19th century, San Francisco's wealth controlled a vast inland empire stretching from Mexico to Canada, and from the Pacific Ocean to the Rocky Mountains. In 1880, San Francisco was the ninth most populous city in the United States and the only one of the nation's top 50 cities located in the western one-third of the country. As a population center, San Francisco remained the dominant city in the west until after 1910. In 1880, it handled 99% of all merchandise imported into the three Pacific states, 83% of all exports and produced 60% of all goods manufactured in this region.

This city, like other cities, has constantly evolved and changed since its founding, destroying former life-ways and their physical manifestations as new ones evolved. The result is a dense concentration of cultural resources within a relatively small area. Viewed in historic terms, four basic eras in San Francisco's history emerge:

a. the Spanish-Mexican period (1776-1846)
b. the Gold Rush (1848-1860)
c. the Empire City of the West (1860-1920)
d. the Loss of Regional Dominance (1920-present)

While the entire waterfront can, in many ways, be seen as a whole -- for example, each I-280 project area segment had some industry during its history and nearly each segment had warehousing and transportation-related activities -- there was enough specialization within the region to isolate three separate areas. These are:

1. China Basin segment
2. South Beach-Rincon Hill, Ferry Building, and Piers 9 to 35 segments
3. Fisherman's Wharf and Fort Mason/Aquatic Park segments

The China Basin Segment

During the Spanish-Mexican era, the China Basin segment was isolated and had no known inhabitants. During the Gold Rush era it became a shipbuilding and dry-dock/ship repair

center. These activities were focused around Steamboat Point, a piece of land extending out into the Bay in the area between today's Second and Fourth Streets and Brannan Street. During most of the Empire period of San Francisco history, the China Basin segment was a thriving manufacturing, storage and transportation center which also had the usual associated service industries, such as saloons and stores. The City dump and Dumpville, an associated shanty town, also existed here from the 1870s until about 1895. Major industrial facilities in the area included the Citizen's Gas Company, the San Francisco Glass Works, the Berry Street Shipyards and the Pacific Oil and Lead Works. The Central Pacific Railroad constructed major facilities in the area in the 1870s.

South Beach/Rincon Hill, Ferry Building, and Piers 9-35 Segments.

The historical focus of this area was transportation and commercial activities. It was and remains today the central part of the waterfront, characterized primarily by wharves, warehouses, and related service industries such as saloons, hotels and boarding houses, restaurants and stores. Some manufacturing also took place immediately inland from the waterfront, but was clearly secondary to the transportation and related commercial activities.

In the Spanish/Mexican period much of the land in this area was under water. It was during the Gold Rush era when this area sprang to life. In 1849, when tens of thousands of gold-seekers passed through and were provisioned from San Francisco, this area was the beginning of the "instant City" that was created to catapult San Francisco from a sleepy town to the biggest metropolis in the west. Yerba Buena Cove became littered with ships of all types; 526 vessels were reported in the Bay in June 1850, most of them in the Cove. Many of these vessels were often abandoned by a crew intent on gaining their fortune in the mines. Some remained in the Bay and were eventually encapsulated in Bay fill. Some of the empty vessels were purchased by entrepreneurs, who would turn them into warehouses, hotels, saloons or stores. Others were taken to Rincon Point to be broken up for their iron and firewood. The area around the deepest point of the Cove, roughly between Market Street and Broadway, almost all the way up to Montgomery Street, became the central part of town and grew most rapidly. Inland of the wharves, large warehouses were also constructed, beginning in the 1850s. In the area bounded by First, Third, Mission and Folsom Streets the community known as Happy Valley sprang up. It began in 1849 as a camp city and evolved into a working class industrial area with the Union Iron Works and other foundries and the San Francisco Gas Company.

In the Empire period (1860-1920), the main trends of development established during the Gold Rush era were intensified. These ineluded transportation, commercial/warehousing services and occasional manufacturing activities. The giants of transportation during this era all used wharves in these areas of the Bay. Included were the Southern Pacific railroad, the Pacific Mail Steamship Company, the California Steam Navigation Company, the Santa Fe Railroad, and others. As the waterfront built up during the 1860s and 1870s, the number of wharves expanded so greatly that by 1877 there were wharves on almost every single block from King and Second to Bay and Montgomery. The densest concentration of service industries -- shops, saloons, lodging houses, restaurants, hotels, and light repair facilities -- was in the Ferry Building segment, while various manufacturing establishments were scattered throughout these three segments, including the Risdon Ironworks, bounded by Spear, Beale, Folsom and Howard Streets and the American Sugar Refining Company, bounded by Battery, Union, Front and Filbert Streets. It was in this section as well, that the original "Fisherman's Wharf" of San Francisco was located -- at the foot of Vallejo Street near Front Street. The Happy Valley area of the earlier era became known as Tar Flat, after the uncontrolled industrial pollution found there. Until the late 19th Century it was also home for many immigrant families - primarily German, Irish and English. While the factories remained, the demography gradually changed from families to single men residing in hotels and boarding houses.

Fisherman's Wharf and Fort Mason/Aquatic Park Segments

In the Spanish/Mexican era there was very little development in this portion of San Francisco, other than a small Spanish battery at Point San Jose (later called Black Point, and, even later, Fort Mason). During the Gold Rush era, the North Beach area was promoted as a residential area by real estate speculators and the Fort Mason area was occupied by squatters, who constructed dwellings later used by the Army.

In the Empire era, specifically the late 1850s and early 1860s, manufacturing began to arrive in this area and continued into the 20th Century. Such enterprises included the Pioneer Woolen Mills, which are a part of Ghirardelli Square today; Shelby's Smelter and Lead Works, which was constructed near today's Aquatic Park; ship repair facilities in the North Point area; and Stouffer Chemical Works, San Francisco Gas Light Company, and the California Fruit Company, which is now the "Cannery". During the Civil War, a battery was constructed at Fort Mason aimed at stopping possible Confederate raids on California. Fort Mason continued as an active Army Supply depot through World War I.

---

[1]Heritage Foundation ratings are as follows:
A = Highest Importance; B = Major Importance; C = Contextual Importance
D = Minor or No Importance; NR = Not Rated (post 1945)

Foundation for San Francisco's Architectural Heritage, Splendid Survivors, California Living Books, 1979. Heritage is a non-profit volunteer historic preservation organization that has identified and documented significant San Francisco buildings.

[2]See Section VIA, Historic/Architectual Resources for explanation of Criteria for Evaluation.

[3]Additional information on the Lydia is available in the report Behind the Seawall, Vol. I, prepared by Archeo-Tec for the San Francisco Clean Water Program, 1981.

APPENDIX G

Elements and Treatments for Project Alternatives

PROJECT ALTERNATIVES

ALTERNATIVES						
	III	IV	IVA	V	VA	VI
o	o					
				o	o	o
		o	o			
	o					
			o	o	o	
		o				
o						o
o	o					o
		o	o	o	o	
	o			o	o	
		o	o			
				o		o[1]
					o	
o[1]						
	o	o	o			o
				o	o	
o						
o	o	o	o	o	o	o
o	o	o	o	o	o	o
		o	o	o	o	o
o	o					

Station area.

ments of the I-280 Transfer
Treatments. The horizontal
tive is an aggregation of one
ets in the vertical columns.

TABLE G-1

ELEMENTS AND TREATMENTS FOR PROJECT ALTERNATIVES

ELEMENTS AND TREATMENTS	ALTERNATIVES							
	I	II	III	IV	IVA	V	VA	VI
I-280 TOUCH DOWN								
1. Add Entry Ramp Between 3rd & 4th Streets		o	o					
2. Add Entry & Exit Ramps @ 2nd & King Streets						o	o	o
3. Pull Back to 6th St. & Connect with Street System				o	o			
4. Maintain Existing Facility "as is"	o							
EMBARCADERO FREEWAY								
1. Remove from Beale to Broadway			o					
2. Remove and Add Entry & Exit Ramps near Folsom/Spear Streets					o	o	o	
3. Remove from Beale to Broadway and Add Exit Ramp Only near Folsom/Spear Streets				o				
4. Maintain Existing Facility "as is"	o	o						o
EMBARCADERO SURFACE ROAD								
1. Reconstruct, 4-lanes throughout		o	o					o
2. Reconstruct from 4- to 6-lanes as appropriate				o	o	o	o	
3. Maintain Existing Roadway	o							
MUNI METRO/PCS EXTENSION								
1. Muni Metro from Embarcadero Station to SP Depot, with turnback			o			o	o	
2. Muni Metro from Embarcadero Station to SP Depot with turnaround loop				o	o			
3. PCS extension to Downtown (at and below grade to Rincon Annex)						o		o[1]
4. PCS subway extension to Transbay Terminal							o	
5. Neither extension (Maintain Existing)	o	o[1]						
MUNI E-LINE STREETCAR								
1. From Fort Mason to SP Rail Line Depot			o	o	o			o
2. From Fort Mason to F-Line Interface						o	o	
3. New Bus Line from Fort Mason to SP Depot		o						
4. No E-Line (Maintain Existing)	o							
STREET AND RAMP MODIFICATION								
1. I-280/Embarcadero Area		o	o	o	o	o	o	o
2. None (Maintain Existing)	o							
INTERCEPT PARKING								
1. I-280/Embarcadero Area		o	o	o	o	o	o	o
2. None (Maintain Existing)	o							
TSM IMPROVEMENTS ALONG NORTH-EASTERN WATERFRONT								
1. Currently Planned and as Appropriate				o	o	o	o	o
2. As currently planned	o	o	o					

[1] Also includes Muni Metro turnback facility at Embarcadero Station area.

Note: The vertical axis of this matrix presents the Elements of the I-280 Transfer Concept Program discussed in this report and their Treatments. The horizontal axis denotes the eight alternatives. Each alternative is an aggregation of one Treatment from each Element as denoted by the bullets in the vertical columns.

APPENDIX H

Senate Concurrent Resolution No. 74

Senate Concurrent Resolution No. 74

RESOLUTION CHAPTER 46

Senate Concurrent Resolution No. 74—Relative to transportation.

[Filed with Secretary of State June 5, 1984.]

LEGISLATIVE COUNSEL'S DIGEST

SCR 74, Foran. Mass transit service: San Jose-San Francisco corridor.

This measure would request the Metropolitan Transportation Commission, in cooperation with the Department of Transportation and transit operators and local governments in the San Jose-San Francisco corridor, to develop a mass transit system plan and an incremental improvement plan, as specified, for that corridor and would request that the plans be submitted to the Legislature no later than March 1, 1985.

WHEREAS, The Metropolitan Transportation Commission is the transportation planning agency responsible for the planning of transportation services for the nine San Francisco Bay area counties, including the Counties of Santa Clara, San Mateo, and the City and County of San Francisco; and

WHEREAS, Travel demand in the peninsula transportation corridor between San Jose and San Francisco at this time exceeds capacity, and that travel demand is expected to continue to grow; and

WHEREAS, The streets and highways in this corridor are congested, and major highway expansion alternatives are not physically and economically feasible; and

WHEREAS, The peninsula rail commute service operated by the Department of Transportation is a commuter service with limited service capacity and terminal locations that do not meet the user's needs; and

WHEREAS, A comprehensive and complete mass transit plan for the corridor is not available to guide future transit improvements for the San Jose-San Francisco corridor; now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That the Metropolitan Transportation Commission, in cooperation with the Department of Transportation and the transit operators and local governments in the corridor, is hereby requested to develop a mass transit system plan and an incremental improvement plan for the transportation corridor between the Cities of San Jose and San Francisco; and be it further

Resolved, That the mass transit system plan include a rail transit system between a rail transit station in the City of San Jose and rail transit station in the City of San Francisco and identify the route, the

96 60

vehicle type, the operational characteristics, and an institutional and financial arrangement for implementing the plan; and be it further

Resolved, That, in preparing the plan, the commission should, at a minimum, consider the following alternatives:

(1) Extension of the San Francisco Bay Area Rapid Transit District (BART) service from Daly City to the San Francisco International Airport and south to San Jose.

(2) Extension of BART service from Daly City to the airport and establishment of a light rail transit system from the airport to San Jose.

(3) Upgrading the existing Department of Transportation service with the possibility of a light rail transit system between San Francisco and San Jose, utilizing the Southern Pacific Transportation Company corridor, with extensions to connect with the Guadalupe light rail line in San Jose and the San Francisco Municipal Railway or BART in San Francisco; and be it further

Resolved, That the incremental improvement plan identify cost-effective staged improvements that are financially feasible and that would lead to the ultimate implementation of the mass transit system plan; and be it further

Resolved, That the Department of Transportation, the transit operators and local governments, cooperate with the commission in the development of these plans and plan their future improvements to be consistent with the system plan and the implementation plan; and be it further

Resolved, That the commission is requested to submit its mass transit system plan and the incremental improvement plan, along with recommendations for institutional and financial arrangements, to the Legislature no later than March 1, 1985; and be it further

Resolved, That the Secretary of the Senate transmit copies of this resolution to the Metropolitan Transportation Commission, the Department of Transportation, the San Francisco Bay Area Rapid Transit District, the San Francisco Public Utilities Commission, the San Mateo County Transit District, and the Santa Clara County Transit District.

O

96 80